THE

MAGAZINE

OF

USEFUL AND ENTERTAINING KNOWLEDGE.

"GET WISDOM: AND WITH ALL THY GETTING, GET UNDERSTANDING."

VOL. II. NEW-YORK, FEBRUARY, 1831. No. 2.

BIOGRAPHY.

BIOGRAPHICAL SKETCH OF COLUMBUS.

[Concluded from page 13, Vol. II.]

WHILE Columbus was thus successfully engaged in restoring tranquillity to the island, and punishing the enemies of order, his enemies were equally successful in their machinations to undermine the confidence reposed in him by the sovereigns of Spain. He was represented as being extremely tyrannical and arbitrary in his government, as deceiving by false representations of the wealth of the new world in mines and precious metals, the King and Queen, as to the value of his discoveries; and they even insinuated that it was his intention to cast off all allegiance to Spain, and either make himself sovereign of the new world, or place himself and it under the protection of some other foreign power. At length, by the constant repetition of these slanders by every Spaniard who returned from the new world without those immense riches which he had promised himself on his departure from home, even Isabella, the firm, constant, and unwavering friend of the admiral, began to doubt of the correctness of his conduct, and was finally prevailed upon to assent to the sending out a commissioner to investigate his conduct and if necessary, to supersede him in command.

The person selected for this important, and delicate office was Francisco de Bobadilla, who was furnished with the following letter:

"To Don Christopher Colon. our admiral of the Ocean. We have ordered the commendary, Francis de Bobadilla, the bearer, to

acquaint you with some things from us; therefore we desire you to give him entire credit, and to obey him. Given at Madrid, 21 May, 1499. I the King, and I the Queen."

Armed with this plenary power, Bobadilla arrived at St. Domingo on the 23d of August, 1500. Columbus being absent in the interior of the Island, the commissioner without inquiring into the truth of the charges he was sent to investigate, immediately assumed upon himself the supreme power. He took up his residence in the house of Columbus, and seized upon his arms, gold plate, jewels, letters and manuscripts, which he disposed of without giving any account of them whatever. The admiral was not long ignorant of these proceedings and of the power of Bobadilla, having received the foregoing letter of the Spanish Sovereigns, and at the same time a peremptory summons from the commissioner, to appear immediately before him. This summons he obeyed; but no sooner did he arrive in San Domingo, than he was put in irons and confined in the fortress: his brother, Don Diego, had in the meantime been also put in irons and confined on board a caravel.

We cannot contemplate the present situation of Columbus without having our indignation aroused, not only against the tyrannic Bobadilla and the base and servile myrmidons who were ready to court the favour of those in power by acts of the basest ingratitude, but against the Spanish sovereigns to whose glory and renown he had added such lustre, and the extent of whose dominions he had more than doubled. Columbus however behaved with his characteristic dignity and moderation on this trying occasion. "There is a noble scorn which swells and supports the heart, and silences the tongue of the truly great, when enduring the insults of the unworthy. The admiral could not stoop to deprecate the arrogance of a weak and violent man like Bobadilla. He looked beyond this shallow agent and all his petty tyranny, to the sovereigns who had employed him. It was *their* injustice and ingratitude alone that could wound his spirit; and he felt assured that when the truth came to be known, they would blush to find how greatly they had wronged him. With this proud assurance, he bore all present indignities in silence."*

The charge of conducting Columbus to Spain, whither he was ordered by Bobadilla, was intrusted to Alonzo de Villejo who possessing generous feelings, would have removed the irons from his prisoner, but having been put on him by their majesties' officer, he would by no means permit them to be removed but by their orders, saying "he was resolved to keep those fetters as relicks, and a memorial of the reward of his many services; and this," says his son, "he accord-

* Irving.

ingly did; for I always saw those irons in his room, and he ordered them to be buried with him."

The arrival of Columbus at Cadiz, in chains, produced a universal burst of indignation from one end of the kingdom to the other. "No one," observes Mr. Irving, "stopped to reason on the subject. It was sufficient to be told that Columbus was brought home in chains from the world he had discovered." Learning in what manner he had been used, and being convinced that his actions and motives had been grossly misrepresented by his enemies, the heart of the high-souled Isabella was filled with sympathy and indignation. Columbus was immediately invited to court by the sovereigns, who expressed their regret at what he had suffered, remitted him two thousand crowns to defray his expenses, and ordered that he should be treated with the highest distinction.

"The loyal heart of Columbus was cheered by this letter from his sovereigns. He appeared at court, not as a man ruined and disgraced, but richly dressed, and with an honourable retinue. He was received by their majesties with unqualified favour and distinction. When the Queen beheld this venerable man approach, and thought on all he had deserved, and all that he had suffered, she was moved to tears. Columbus had borne up firmly against the stern conflicts of the world; he had endured with lofty scorn the injuries and insults of ignoble men, but he possessed strong and quick sensibility. When he found himself thus kindly received, and beheld tears in the benign eyes of Isabella, his long suppressed feelings burst forth; he threw himself upon his knees, and for some time could not utter a word for the violence of his tears and sobbings. Ferdinand and Isabella raised him from the ground, and endeavoured to encourage him by the most gracious expressions." *

From the manner in which he had been received, Columbus expected to be immediately reinstated in his government, and sent back in triumph to San Domingo, especially as the proceedings of Bobadilla were disavowed as contrary to his instructions, and his recall determined on. But this was far from the intention of the cold and crafty Ferdinand. He had long regretted having invested Columbus with such extensive powers in the new world, and especially since its extent had begun to be known, and he now meanly determined never to reinstate Columbus in those dignities and privileges which had been guaranteed to him by solemn treaty: plausible reasons were given for sending out another person, Nicholas de Ovando, to supersede Bobadilla, with which Columbus was obliged to be content; though this disappointment threw a gloom over the remainder of his days.†

† Irving. * Fernando Columbus.

Ovando left Spain to assume the government of the colony on the 13th July, 1502; and it is worthy of remark, that while Columbus, to whose genius, labour and perseverance, Ferdinand and Isabella owed the vast accession of wealth and territory they had acquired by the discovery of the new world, could with difficulty at any time procure five or six small vessels, and a scanty supply of necessaries for the use of the colonists, Ovando, a royal favourite, was furnished with a fleet of thirty sail well laden with supplies for the colony, and allowed a brilliant retinue and a body guard of horsemen. Though Columbus had been thus basely divested of his government, it was impossible for him to remain long inactive.

Vasco de Gama had now recently arrived at the East Indies by doubling the Cape of Good Hope, and others, following his track, were returning with valuable cargoes of spice, silks, and other East India productions. This circumstance aroused the emulation of Columbus. The voyage to the East Indies, by the way of Good Hope, was a long and tedious one; and he now felt confident, as indeed he had ever since he had conceived the idea of seeking those regions of wealth in a western direction, that they could be reached by a route less circuitous, and much shorter. From his own observations of the currents in the Caribbean sea, and from the reports of other navigators who had followed where he alone had dared to lead the way, he was persuaded that there existed some where in the vicinity of this sea, a strait connecting the Atlantic with the Indian Ocean, and through which these currents passed. His ambition was fired with the thought of discovering such a passage, and thus connect the New World he had discovered, with the opulent regions of the East.

His views were unfolded to the sovereigns, who, willing to employ him so long as there was any probability of his contributing to *their* glory, or of opening new sources of *wealth*, immediately authorized him to fit out a few vessels for the proposed discovery. He accordingly departed without delay for Seville, to make the necessary preparations for his voyage; but such were the impediments thrown in his way by his enemies, and especially the base and implacable bishop, Fonseca, that he was not able to get four small vessels ready for sea in less than about nine months.

It was on the 9th of May 1502, that Columbus, now about sixty six years of age, set sail from Cadiz on his fourth voyage for the New World. In this voyage he was accompanied by his favourite brother, Don Bartholomew, who commanded one of the vessels, and by his son Don Fernando.

Arriving off the harbour of San Domingo on the 29th of June, he found in it the fleet which had brought out Ovando and his numerous retinue, ready to sail for Spain with Roldan, Bobadilla, and their re-

spective adherents: aboard of this fleet were also immense quantities of gold, which had been gained by these execrable beings, by the most inhuman oppression of the unhappy natives. The experienced eye of Columbus enabled him to see signs of an approaching storm, and he requested permission to shelter his vessels in the harbour until it had passed, but he was forbid to enter it! He then sent a message to the governor, advising him to detain the fleet until the storm, which he was certain was approaching, had passed; but this message was as little heeded as the other. Being thus refused shelter in the very island he himself had discovered, and by the officer of the sovereigns, whom he was then serving,—probably by the express order of those sovereigns,—he left the mouth of the river, deeply affected at the base and ungrateful treatment he had received, and sought such security as he might be able to find.*

In the meantime, disregarding the advice of Columbus, the fleet put to sea, homeward bound, on board of which were Roldan, Bobadilla, and many other of the admiral's personal enemies; but they had scarcely been out two days before the predicted storm overtook them, and so terrible was its fury, that of the eighteen ships which left port, only four were saved, and only one, the very one which happened to have on board a quantity of gold belonging to Columbus, kept its way homeward; the other three put back in a most terribly shattered condition. The ship on board of which were Roldan and Bobadilla was swallowed up, together with the principal part of the ill-gotten treasure they were bearing with them. Though the little squadron of Columbus suffered severely, yet by his own and the skill of his brother, it weathered the storm, not a man having been lost. "Many of the superstitious seamen," observes Mr. Irving, "who from the sagacity displayed by Columbus in judging of the signs of the elements, and his variety of scientific knowledge, looked upon him as endowed with supernatural powers, and fancied he had conjured up the storm by magic spells, for the destruction of his enemies."

Having repaired the damage which his vessels had sustained by this storm, Columbus steered in search of a passage from the Atlantic to the Indian Ocean. In this voyage, which was a long and perilous one, Columbus, his crews, and vessels, suffered extremely: the first, from his usual complaint, the gout, which was brought on and aggravated by watchfulness and anxiety; the second, from excessive fatigue, and the third from an almost continued succession of storms of wind and rain, accompanied with the most terrible thunder and lightning. Columbus had occasional interviews with the na-

* Fernando Columbus.

tives along the coast he was exploring, but he generally found them suspicious, fierce, and warlike. Having sailed along the coast for several hundred leagues, and passing the Isthmus of Darien, without perceiving any appearance of a strait—the seamen, too, being disheartened by a constant contention with adverse winds and currents, and the ships, moreover, being every where pierced through by the teredo, or worm, so destructive in tropical seas—Columbus now consented, at the urgent solicitation of the crews, to return to the coast of Veragua, and search for the mines which he had been informed abounded there.

"Here, then," says the elegant author we have so often quoted, "ended the lofty anticipations which had elevated him above all mercenary views in his struggle along the perilous coasts, and had given a rare character to the early part of his voyage. It is true, he had been in pursuit of a mere chimera, but it was the chimera of a splendid imagination and a penetrating judgment. If he was disappointed in his expectation of finding a strait through the isthmus of Darien, it was because Nature herself had been disappointed, for she appears to have attempted it in vain."

After encountering the most violent storms, and being tossed about for several weeks in the most perilous situation, on a lee-shore, Columbus at length arrived and anchored in the mouth of the river Veragua. In this vicinity he found abundance of gold, and procured considerable from the cacique of the country, and the natives, who were, however, of a fierce, warlike disposition, and more inclined to dispute the right of the Spaniards to intrude upon their soil, than to gratify their appetite for gold. Finding the country so abundant in this metal, Columbus concluded to leave a part of his crews here to commence a settlement, until he could return to Spain for supplies and reinforcements: in the propriety of this measure, his brother, Don Bartholomew, concurred, and agreed to remain in charge of the seventy men who were selected to remain. But the plan was finally frustrated by the hostilities of the cacique of Veragua, who assembled his warriors in such numbers, and fought with such determined bravery as to render it an act of madness for so small a number of Spaniards, badly prepared as they were, to attempt to maintain a footing in the country.

Toward the end of April, 1503, Columbus set sail from the coast of Veragua, but not with the same number of vessels as he had arrived with, being obliged to abandon one. His intention was to make the best of his way to Hispaniola, and knowning the strength of the currents in the Caribbean sea, he kept along the coast, eastward as far as the Gulf of Darien, from whence, after abandoning one of his caravels on account of her leaky condition, he stood northward; but

notwithstanding his precautions, he was carried so far west by the currents as to find himself, on the 30th of May, on the southern coast of Cuba instead of Hispaniola. Here a violent storm coming on, the caravels, now little better than mere wrecks, were dashed against each other, and shattered to such a degree as to render them unsafe sea-boats, and he therefore stood over to Jamaica, in search of a port. His vessels being every moment in danger of foundering, Columbus run them aground in a small harbour, within a short distance of the shore, where they were fastened together, and soon filled.

Having provided the best accommodations possible for those under his charge, and made an arrangement with the Indians to supply him with provisions in exchange for European trinkets, a canoe was despatched under the charge of Diego Mendez, who volunteered to go in her, to Hispaniola to obtain a vessel to receive Columbus and his crews. Many months passed away after the departure of this embassy, and still no vessel appeared to relieve the Spaniards: at length, impatient of the delay, and losing all hope of relief from their friends, a part of the crews mutinied and determined to seek Hispaniola in open canoes.—They made the attempt, but were driven back by a head wind and a heavy sea—a second attempt was not more successful, and the mutineers now abandoning the hope of again seeing Spain, returned toward the harbour where Columbus and the rest were, roved from village to village, living upon the provisions of the Indians, whom they treated in a most shameful manner. This treatment exasperated the Indians against the whole of the Spaniards, so that they no longer continued to furnish Columbus and his followers with their usual supply of provisions, a circumstance which seemed to threaten the most disastrous consequences, especially as in their present weakened state they were unable to compel the Indians to supply them with necessary food.

The horrors of famine were thus staring Columbus and his adherents in the face, when a fortunate idea presented itself to him. By his knowledge of astronomy he had ascertained that there would happen a total eclipse of the moon in a few days: he therefore summoned the principal caciques to a grand conference on the same evening. When they were assembled he informed them that the Great Spirit was very angry at their refusing to supply him (Columbus) with provisions as usual, and intended to punish them with famine and pestilence. That, lest they should not believe what he had told them, a signal would be given that night—they would behold the moon lose its light, and be taken from them.

Some of the caciques affected to disbelieve this story, but others were alarmed at the prediction: when, however, the moon began to

be hid, and a mysterious gloom to cover the whole face of the earth, all were convinced that the words of Columbus were true—they were seized with the greatest consternation, and hastened to throw themselves at his feet, promising to supply him with every thing he should ask if he would intercede with the Great Spirit to withhold his punishments. Columbus retired to his cabin for a few minutes, under pretence of holding communication with the Deity, but soon returned, as may be supposed, with the comforting assurance that, at his intercession, their punishments would be withheld, provided they did not offend him again. The moon soon appeared again in unclouded brightness, a token of the reconciliation of the Great Spirit, to the no small comfort of the simple natives, and the no less comfort of the sagacious admiral, whom they did not neglect to supply with an abundance of every thing they had to give.*

At length, after being shut out from the world, and confined upon the shore of a wild and almost unknown island for nearly a year, two vessels arrived on the 26th of June, 1504, to carry Columbus and the Spaniards with him to Hispaniola, where the story of his misfortunes had prepared for him a kind reception from the inhabitants. For seven months the faithful and indefatigable Diego Mendez had vainly importuned the cold-hearted and inhuman Ovando, governor of Hispaniola, for a vessel to go to the relief of Columbus, nor did he succeed to obtain one until his long delay, and unfeeling indifference to the fate of one to whom the world was so deeply indebted for his important discoveries, aroused the public indignation, and called forth the severest animadversions on the conduct of the governor, even from the pulpits; nor until Diego himself had hired and fitted out a vessel at the expense of Columbus, and was about despatching it to his relief.*

After a short stay at Hispaniola, where Columbus found, as he expressed himself in a letter to the sovereigns, "that since he had left the island, six parts out of seven of the natives were dead, all through ill-treatment and inhumanity—some by the sword, others by blows and cruel usuage, others through hunger, the greater part having perished in the mountains, whither they had fled, from not being able to support the labour imposed upon them," he departed for Spain, and arrived in the harbour of San Lucar on the 7th of November.

Being unable, from his infirmities, to go to court, he spent the following winter in Seville, exerting himself strenuously, but ineffectually, to draw the attention of the sovereigns to the disastrous state of Hispaniola, under the administration of Ovando, and to ob-

* Irving.

tain restitution of his honours, and the payment of his arrears. But his last and only friend, Isabella, being like himself, languishing upon a bed of sickness, his letters were unregarded, and his just claims were treated with indifference and neglect, while he was suffering under the severest penury.

The death of Isabella blasted his hopes at court. Ferdinand, selfish, politic, and ungrateful, had even treated him with worse than indifference—it was only from the justice and magnanimity of Isabella that he could hope to obtain his just rights and honours—her death left him friendless and hopeless.

In a letter which he wrote a few weeks before his death to the archbishop of Seville, he expresses his despair of obtaining justice at his majesty's hands. "It appears to me," he observes, "that his majesty does not think fit to fulfil that which he, with the queen, who is now in glory, promised me by word and seal. For me to contend to the contrary would be to contend with the wind. I leave the result to God, whom I have ever found propitious to me in my necessities."

But the long and eventful life of Columbus was fast drawing to a close, and with it his troubles and anxieties. Finding his end approaching, he arranged all his earthly affairs for the benefit of his successors. His favourite brother, Don Barthol mew, was at this time attending to his affairs at court; but he was surrounded by a few faithful friends and followers, during his last illness, among whom were his son Diego, Diego Mendez, and Bartholomew Fiesco, who undertook the perilous expedition from Jamaica to Hispaniola. He died on the 20th May, 1506, aged about seventy years. His remains were deposited in the parochial church of Santa Maria de la Antigua, in Valadolid, but afterward was removed to the Carthusian convent, at Seville. In the year 1536, the bodies of Columbus and his son Diego, were transported to Hispaniola, and interred by the side of the altar of the grand cathedral of the city of San Domingo. But on the cession of that island to the French, in 1795, they were again disinterred, conveyed to Havan , and deposited in the cathedral of that city, where they still remain.*

* Irving.

CHEMISTRY.

Concluded from our last.

After the death of Stahl and Boerhaave very little was done to improve the science of chemistry until the year 1756, when Dr. Black of Edinburgh published his treatise on Magnesia. This publication laid the foundation for the splendid discoveries in Pneumatic Chemistry, which so remarkably distinguished the succeeding half century. Dr. Black's merit is great in almost every department of the science, but he is pre-eminently distinguished for his discoveries in heat. None of his immediate successors in the track of discovery are more meritorious than Henry Cavendish. This gentleman was of a noble family, and though abounding in wealth, he lived a very retired life, devoting his leisure to science. His papers are finished models of elegance, precision, and depth. He died in 1810, leaving a fortune of a million and a half sterling. His main discoveries relate to the composition of water, of atmospheric air, and of nitric acid, and they contributed essentially to settle beyond controversy those very imporant points of elementary combination.

The discoveries of Dr. Priestley followed in the train of those of Cavendish, and to very few men, whose names are recorded in the history of this science, is the meed of praise more justly due.

In the career of Pneumatic Chemistry, he surpassed all his cotemporaries in the number of his discoveries. To him we are indebted for the invention of the Hydro-Pneumatic apparatus in common use, and if no other discovery had crowned his investigations, that of oxygen gas, would have placed his name in a roll of honour as durable as the records of the science.

Scheele, a Swedish Chemist, was cotemporary with Priestley, and scarcely his inferior either in number of original discoveries, or in ingenuity of research. He likewise discovered oxygen gas by several processes, all varying from that of Dr. Priestley, and without any knowledge of the success of the British Philosopher.

It was at this period also, (viz. the period of American Independence,) that there arose in the city of Paris a school of chemistry, which acquired for that city a celebrity in science much beyond even its former fame. At the head of this distinguished school was Laurence Antoine Lavoisier one of the greatest names in the annals of our science. I should not do justice even to this rapid sketch

did I not mention the fate of this worthy sçavant. After filling with great integrity, several responsible offices in the government; after enriching the annals of the Academy of Science with more than forty memoirs on important subjects of science, and acting with fidelity as its treasurer; after increasing the reputation not only of the school of philosophers with whom he was associated, but of the metropolis, and of France itself, he had the misfortune to be found, during the sanguinary period of the revolution, among those citizens who were in possession of property, of learning, and of character. His name was placed on the list of the accused; and condemnation and decapitation were then the rapid consequences of accusation. He had done so much for Chemistry that he knew his future reputation would be involved in the result of his theories. He was engaged when accused in an interesting Chemical investigation, and requested a respite of fourteen days for its completion. He was answered that France had no need of chemists, and was hurried to the scaffold.

Among the associates of Lavoisier, who shared in his scientific honours, were Berthollet, Guyton, La Place, Monge, Fourcroy, and several others. Their numerous researches, and what was of still greater consequence, their cautious and logical deductions, led to the overthrow of Stahl's theory, and introduced more enlarged and correct views of chemical combinations. Lavoisier's treatise on chemistry furnished the most beautiful example of logical and inductive reasoning, that had ever been published in experimental science, and gave an impulse to the study of it unknown before.

In the year 1800, Signor Volta of Pavia made known his discovery of the Galvanic, (or more properly of the Voltaic) Pile; and the same year Humphry Davy, an assistant of Dr. Beddoes at Bristol, then in the 22d year of his age, published a volume of Chemical Researches. These two events are worthy of being mentioned, not only as having occurred in the first year of the present century; but as having a mutual and an important bearing upon the most splendid portion of chemical history. Davy's treatise procured for him the professorship of chemistry in the Royal Institution of London, and while there, having at his command a most affluent provision for experimental research, he employed the Voltaic instrument on a scale of such magnificence and power, with such an unparalleled address, and with views at once so acute and comprehensive, as to make discoveries which have raised him to the pinnacle of fame, and which placed him in the most exalted chair which the philosophy of England has at its disposal;—the seat which had been filled by Sir Isaac Newton, as president of the Royal Society, and which had been recently vacated by the death of Sir Jos. Banks. This seat, though he was young in years, was dignified by his name, and by the manner in

which he fulfilled the duties it required. His sovereign had, previous to this appointment, created him a Baronet. Sir Humphry Davy died at Geneva on the 28th of May, 1829, aged but fifty and a half years. His name, like that of Newton, will be identified with the renown of British Genius, and his memory will be embalmed in the triumphs of chemical philosophy.

To enumerate the discoveries of Davy, and much more to detail those of the whole period in which he lived, enriched as it was by the labours of a more numerous corps of learned and distinguished men than had ever before been found as co-workers in the domain of science,—would carry me far beyond the limits of this discourse. The names of two of his fellow-countrymen, pre-eminent, like himself, in talents and discovery, cannot be justly omitted. They are Wollaston and Dalton. The former has recently followed Sir Humphry to the tomb. No real chemist or physician can now, or hereafter, be ignorant of his merits. The latter lives in much retirement at Manchester, but as a profound philosopher and chemist, and by his philosophy a benefactor of the arts, there is not perhaps a person living who is his superior.

The first quarter of the present century has, upon the whole, been the most brilliant and fertile era which has ever shone upon the history of science; and the age in which we live is enriched, beyond all calculation, with the fruits of its genius. But, as it is very possible, and not very unusual, to find individuals of good repute in the common walks of life, who in reference to the utility of promoting a general study of the sciences will significantly inquire, *cui bono*,—of what use to me or to my children,—it is expedient that I attempt to furnish an answer.

That the study of the sciences, or the attendance upon stated courses of instruction in learning and the arts, may not have the effect of enabling the student, or hearer, to eat with a better appetite, to sleep more soundly, or to make more money, may be true. But is it thence to be inferred that this additional knowledge will not be to him of any use? Upon a similar principle of reasoning might a person who has been deprived from infancy of the use of sight, declare, that eyes would be of no use to him, for he is happy and prosperous without them. He eats and sleeps, and enjoys society as well, or better, than thousands of the clear-sighted. He can therefore very well dispense with the additional knowledge which eyes would confer upon him; and it will be wisdom in him to save the money which the oculist would demand for removing the obstructions to his vision. Are not the deaf and dumb also happy in the sphere in which Providence has seen fit to place them? By the kindness of others they can receive all the instruction which their case demands,

and they themselves can impart the same knowledge to others of their class. Agreeably therefore to this easy logic, ears and speech would be of no use to them. If they cannot talk or sing, they can gesticulate far better than those that do, and by the destitution of hearing they are saved from a thousand reports and injuries, which would wound their feelings and render them unhappy. The fallacy of these arguments need not be pointed out. To demonstrate the universal fitness and utility of knowledge to beings endowed with the faculty of reason, and who are furnished with a portion of that divine curiosity which urges an intellectual being to inquire into the wonders and wisdom of that creation which is spread around him, and who is possessed of that sympathetic feeling for his race which leads him to participate in the treasures of thought, and to venerate the talents which have been conferred upon kindred beings,—it can only be necessary to prove that the kind of knowledge which is proposed to his acquisition, does in reality possess the character of utility,—that it is, in its nature, applicable to the arts of life, or abstractedly beneficial by the intellectual habits and powers which it engenders.

That the science of chemistry has strong claims to both these recommendations, I proceed to show,—

First, by its application to the arts of civilized life.

There are few, I may fairly presume, in my present audience, who would deny the importance of any of those arts which are concerned in the planning, construction, completion, and furnishing of a ship. Let us then contemplate an American ship, (for we may search the world in vain to find any that are superior,) which having been on a voyage across the Atlantic, laden with the produce of our soil, is returning and entering our beautiful harbour, freighted with the manufactures of Europe. This erect and noble object, towering so high above the unstable element, and advancing with movements so majestic, fills the imagination with delight. It is one of the proudest monuments of human skill. It is an epitome of all the arts and sciences. It is a concentration of the philosophy of a Newton, the mathematics of La Place, the mechanics of an Arkwright, the chemistry of a Davy, and the learning of a Blackstone. We may admit, indeed, that in the construction of this floating microcosm, mechanical philosophy is of the first importance ;—but without the aid of chemistry the work could not be accomplished.

In the first place, not a step could be taken without the aid of metals. Instruments of iron and steel must be employed to cut down the trees of the forest. But iron can be obtained only through the agency of chemistry. The cheapest and easiest method of reducing the ores of this metal is even still a desideratum in the chemical arts. The substitution of coke for charcoal in that operation, was a most

important step in the progress of the arts of Britain, and was not accomplished until after the protracted labour of her chemists and manufacturers; and now, in our own country, he who shall devise the means of using anthracite coal as another substitute, will become an important benefactor to his country. The manufactory of steel is exclusively a chemical art, and the perfection of it has been materially aided by the direct researches of living chemists. In obtaining also the other metals necessary to a ship, as Copper, Lead, Tin, Brass, &c., the aid of chemistry is indispensable. Metallurgy, in its almost innumerable details, is the offspring of chemistry, and can be kept alive only by her fires. The ship-builder speedily becomes a chemist in the preparation of his tar and pitch, so essential to the safety of his fabric. His ship can scarcely be launched without the aid of soap, and the soap-maker is a chemist. In the use of copper as a sheathing to the bottom of a ship, so needful as a protection from injury, the influence of electro-chemistry was immediately manifest, and science was put into requisition to explain the cause of the corrosion of the metals and to suggest a remedy. This subject constituted one of the latest investigations of Sir Humphry Davy, and his discoveries at the Dock yard of Portsmouth, under the authority of the admiralty, confirm one of the most beautiful theories which his fertile mind had ever suggested. The use of pigments or paints in a ship, is no less needful than ornamental, and in the preparation of these compounds, whether for the decoration of ships or houses,—whether for the varied uses of the sign-painter, or the more faithful delineations of the artist—whether to satisfy the infinite diversities of female taste in the numerous fabrics of apparel, or to add beauty and elegance to the furniture of the cabin, and the drawing-room,—art, must in all these cases, form an association with chemical science, and acknowledge her indebtedness to the crucible and the solvent. The arts of Pottery, of Glass making, of Varnish making, are indispensable to the comforts of a ship. But these beautiful fabrics spring from the regions of chemistry, and would be unknown but for those alliances of natural things which result from its laws.

I need not pursue the illustration farther. Whatever there is in art which depends upon the combination of particles of matter of different qualities, must be illustrated by chemistry, for this is the Sun which can alone throw light upon the toils of the artisan, and convert him from a benighted follower of custom and routine, to the child of science, who shall henceforth behold in his employment the operation of laws which extend far beyond the limits which his fancy had ever reached, and which connect him, not only with the labours of other men, but with the works of nature and the wisdom of nature's God. He is henceforth his own master and no longer a slave. He is a student in

the free school of philosophy, and his constant aim is towards perfection.—What an evidence is afforded of the immense advantage which a nation enjoys, whose artisans breathe the free air of science, or act under the direction of her laws, when we compare the actual condition of the arts, under the enlightened governments of Europe and America, with their condition in China and other countries of the ancient world. In the latter, some of the arts, even those of ornament and elegance, have long since reached a high point of distinction. But in these countries they appear to be merely arts, dependent on processes altogether empirical and traditional. Science, in the abstract, has no existence among them. There are no schools in which its principles are taught, even in the case of Medicine and Surgery. In those arts in which success depends on daily experience, and more especially in those of silk and porcelain, much address has been attained; but it is questionable whether any improvements have been made in them for centuries past. By the single efforts of Wedgwood in England, enlightened as his labours were by a knowledge of the principles of chemistry, more was done to advance the porcelain manufactories of that kingdom than had been effected in China during many ages. In a country which is said to embody one-third of the human race, and whose polity is regarded by its inhabitants as the perfection of human wisdom, some of the most useful arts are unknown,—the known arts are stagnant, and society is in a state of discomfort, revolting to humanity. Contrasting this condition with the blessings we enjoy, and adverting to the progress which our country has made, within the period of our own recollections, we cannot hesitate to regard the connexion between science and a flourishing condition of the useful arts, as sacred and inviolable.

But, fellow-citizens, there are motives to the cultivation of science of a different character from those which rest only on the Baconian maxim that "Knowledge is power." There are motives which are purely intellectual. These motives are of universal obligation. We are born with faculties which demand cultivation. In every mind there is planted a germ of immortal expectation. This pure, vital principle, when unsophisticated by delusive associations, delights in aspirations after knowledge. It makes no lofty pretensions. It is modest and unassuming; but inquisitive and investigating. In the study of nature, animate and inanimate, it is conscious of sympathies which urge it forward in the career of discovery, with a delight which cannot be satiated. It surveys the powers of man and the unbounded field of creation with a sentiment of profound reverence. Every acquisition to its intellectual store, is a stimulus to fresh diligence, and it is impatient of the obstacles which the ceremonies of the world impose upon it. It is impelled however by a generous and social feeling, for it is convinced that beneficence is the most

striking characteristic of the Divine works and government. To cherish this impulse of our nature is surely the highest style of man. It is interwoven with every purified sentiment of religion, for the Deity is glorious in his works. It is in accordance with Christianity; "For,—said a Christian of high authority,—the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead."

The sciences then are friendly to the highest attainments of our intellectual being. While some of them, and more especially astronomy, opens to our view the majesty of Omnipotence in scenes of unparalleled grandeur and sublimity, the walks of chemistry unfold with an almost equally powerful impressiveness, the wisdom, and skill, and benevolence of the Deity in the infinitely diversified arrangements of the world of atoms. The same great agents in nature that bind the planets in their orbits, that send the warmth of vitality and the splendour of light to the utmost confines of the solar system, are also the efficient instruments of Divine power in all those elementary changes by which the earth is decked with the garlands of spring, and the autumn with its infinity of hues; one season with its bloom and perfume, and another with its fruits. All the forms of matter and modes of existence, too multifarious for the life of man and the mind of man to encircle, arise from the combination of a few elements The modern analysis of air, water, and lime-stone, brings into view the elements of oxygen, azote, hydrogen, carbon, and lime, which with sulphur, phosphorus, and a few of the metals, are the only materials which constitute the vegetable and animal world.

But with these tangible and visible essences, are united the wonderful agencies of Electricity, Heat, Light, and Attraction. By these, or a few of these combined, are formed the delicious pulp of the orange and the peach, the grateful acid of the lemon and the strawberry, the nutricious farina of the seed and root, the bitter of the hop, the aroma of the rose, and the concentrated poison of the nux vomica, so powerful that a single drop, placed upon the tongue of an animal, causes instant death. The same elements, by a slight variation of proportions, form in a different race of beings, bone, muscle, hair, and horn, and the purple current from which the whole are elaborated. To what extent the mind of man, guided by the light of science, may be permitted to penetrate the arcana of Almighty power and wisdom, in these arrangements, it is impossible at present to declare. But one thing is certain, that every step of our progress is calculated to produce upon our rational understandings, a more intimate conviction of our entire dependence upon the Being who created and preserves us, and of the inestimable privileges which are reserved for us in the enlarged exercise of our rational and intellectual natures.

HISTORY.

A chronological List of some of the most important Battles recorded in the ancient and modern History of Europe, and in which Europeans were engaged; with the Result of each, &c.

Sack of Troy—Before Christ, 1184.—The Greeks under Agamemnon, Nestor, Achilles, and other celebrated leaders, laid siege to the city of Troy, situated on the River Bosphorus, in Asia Minor, which, after a siege of ten years, was taken, partly by storm and partly by stratagem, and destroyed. The Trojans were commanded by Priam, Hector, Polydamus, Sarpedon, and others.

The Revolution of the Heraclidæ, B. C. 1104, between the descendants of Pelops and the descendants of Hercules. The chiefs of the latter were Temenus, Cresphontes, and Aristodemus; and of the former, Orestes, and his son Tisamanes. The Heraclidæ, or the descendants of Hercules, had been driven from Athens, about a century before this, by Euristheus, king of Argos: they now returned, and attacked the reigning family, defeated them, recovered their power, and made themselves masters of the whole Peloponnesus, with the exception of the provinces of Arcadia and Achaia. Temenus took possession of Argos, Cresphontes of Messinia, and the twin sons of Aristodemus, Eurestheus and Proclus, were made joint kings of Lacedemon.

Battle of Marathon, B. C. 490, between the Persians under Arthaphernes and Datis, and the Athenians under Miltiades. The Persians having reduced several Grecian provinces, advanced towards Attica with a force of 100,000 foot and 10,000 horse. They were met and defeated by the Athenians and Platæans, the former numbering about 9000, and the latter about 1000. The Persians lost 6,400 men: the Athenians and Platæans, 190. Miltiades, who had thus nobly defended his ungrateful country, was soon after accused of treason for failing in an expedition against Poros, fined about 50,000 dollars, and, not being able to pay the fine, was committed to prison, where he died of a wound he had received in this battle!

Battle of Thermopylæ, B. C. 480, between the Persians under the command of Xerxes, their king, and the Spartans, under Leonidas, king of Sparta. Xerxes, with a force, reckoned by Heredotus, at 2,600,000 fighting men, besides about the same number of women,

attendants, &c. strove in vain, for two days, to force the narrow pass of Thermopylæ, which was defended by 6000 Greeks. At length a secret pass having been discovered to the Persians, they surrounded the Greeks, who were thus attacked both in front and rear. Foreseeing certain destruction, Leonidas commanded all to retreat except his own 300 Spartans, and with these he made terrible havoc among the enemy, and fought till every man was slain. Before the engagement commenced, the Persian king demanded of Leonidas the arms of the Greeks; his brief reply was, "come and take them."

Battle of Salamis, (*naval*) B. C. 480, between the Persians, under Ariabignes, brother of Xerxes, and the Greeks under Euribiades and Themistocles. The Persian fleet, consisting of 1200 sail, was defeated by the combined Grecian fleet of 380 sail. Xerxes immediately after this, and the memorable battle at Thermopylæ, retreated across the Hellespont, now the Bosphorus, with the greater part of his army, but leaving one of his generals, Mardonius, in Greece, with 300,000 men.

Battle of Platea, B. C. 479, between the Persians, under the command of Mardonius, and the combined army of the Lacedemonians, Athenians, and some other Greeks, in all about 108,000, who were commanded by Pausanias and Aristides:—the Persians were completely routed, and Mardonius killed.

Battle of Mycale, (*naval*) B. C. 479, the same day the Greeks, under Lestychides and Xantippus, attacked and destroyed the remains of the Persian fleet, which put an end to the Persian war.

Battle of Ægospotamos, (*naval*) B. C. 405, between the Spartans, under Lysander, and the Athenians, under Coron. The war between Athens and Lacedemon had continued for some time, with various success, each party being by turns victorious and vanquished: in this battle, however, the Athenians were totally defeated, their naval power annihilated, their city blockaded by sea and land, and reduced to the last extremity. The Peloponnesian war, which had lasted for 28 years, was terminated by this battle. The Athenians agreed to demolish their port, limit their fleet to 12 ships, and to undertake no enterprise in future, but under the command of the Lacedemonians.

Revolution in Athens, B. C. 401.—Lysander had imposed certain rulers upon the conquered Athenians, commonly known by the name of "the thirty tyrants:" these were now expelled by Thrasybulus, who restored liberty to his country.

Battle of Cunaxa, B. C. 401, between the Persians, under Artaxerxes, and Greeks and Asiatics, under Cyrus, Xenophon, and Clearchus. Cyrus, brother of the Persian king, attempted to wrest

the sceptre from him, for which purpose he obtained the assistance of 13,000 Greeks, under the command of Xenophon and Clearchus; an engagement ensued, in which, though the royal army was defeated, Cyrus was slain. The Greeks lost 3000 of their number, but the remaining 10,000 made a masterly and celebrated retreat, traversing a hostile country, of 1600 miles in extent, from Babylon to the Euxine sea, and thence to their own country.

Battle of Leuctra, B. C. 371, between the Thebans, commanded by Epaminondas, and the Spartans, under the command of Cleombrotus.

Thebes being divided by factions, one party sought the aid of the Spartans, who being thus introduced into the city, embraced the occasion to get possession of the citadel. Four hundred citizens fled to Athens, among whom was Pelopidas. Pelopidas and his friend Epaminondas afterward succeeded in surprising the Spartans, and in driving them out of the city. A war ensued, Pelopidas perished, but his friend triumphed over the enemies of his country, and freed her from a foreign yoke.

Battle of Mantinea, B. C. 363.—The war between Thebes and Sparta continued for several years. The Athenians, who at first assisted the Thebans, were now opposed to them ; but in this battle the combined army of Spartans and Athenians was defeated by the Thebans, whose victory cost them the loss of their general, Epaminondas. Peace, however, was the result.

Battle of Cheronea, B. C. 338, between the Macedonians, commanded by Philip, and the Athenians and Thebans, under Chares, Demosthenes, and Lysicles. This battle decided the fate of Greece. Philip, king of Macedon, being victorious, subjugated all the states of Greece to his own dominion, but wisely indulged them with the *forms*, while he deprived them of the *substance* of liberty.

(To be continued.)

CHRONOLOGY OF REMARKABLE EVENTS THAT HAVE HAPPENED IN THE MONTH OF FEBRUARY.

1. France declared war against England and Holland, 1793
" Non-intercourse with Great Britain established, 1811
" Dreadful, but indecisive battle ,near Brienne, between the French, under Napoleon, and the allied army, which lasted from the 27th January to the 3d of February, 1814
3. Spanish Inquisition abolished, 1813

6. Charles II. died, 1685
" Treaty concluded at Paris, between France and the United States, 1778
" Valencia, together with the army under Gen. Blake, surrender to the French, 1812
7. Battle of Eylau—Prussians defeated by Napoleon, 1807
8. Mary, Queen of Scots, beheaded, 1586
9. French frigate L'Insurgente, captured by the U. S. frigate Constellation, captain Truxton, 1799
" Treaty of peace between France and Germany, signed at Luneville, 1801
" Monte Video taken by the British, 1807
10. Treaty of Paris, by which peace was concluded between Great Britain, France, and Spain, and Canada, Louisiana, and the Floridas ceded to the former, 1763
11. Voltaire born, 1694
12. Trial of Warren Hastings, which lasted seven years, commenced, 1788
13. William and Mary proclaimed king and queen of England, 1689
" Monastic establishments abolished in France, 1790
" Duke de Berri, heir to the French throne, assassinated, 1820
14. Captain Cook killed, 1779
" Spanish fleet defeated off Cape St. Vincent, by the British squadron, under Sir John Jervis, afterward Earl St. Vincent, 1797
15. Ceylon taken by the British under Gen. J. Stuart, 1795
16. U. S. frigate Philadelphia destroyed by 70 volunteers from the American squadron, commanded by lieutenant Stephen Decatur, in the harbour of Tripoli, 1804
" An earthquake at Malta, 1810
17. Amboyna and its dependencies surrender to the British, 1810
" Napoleon issues a decree uniting Rome to France, 1810
" Peace with Great Britain ratified by the U. States, 1815
18. Vermont admitted into the union, 1791
19. Florida ceded to the U. States, 1821
20. The Cyane and Levant captured by the U. S. frigate Constitution, captain Stuart, 1815
22. Washington born, 1732
" Naval engagement between the French and English fleets off Toulon, 1744
" Public funeral of the right hon. Wm. Pitt, 1806
24. Battle of Pavia, in which Francis 1st, of France, was defeated and taken prisoner by the troops of the Emperor Charles V. under the Constable Bourbon, 1525

4. Martinique taken by the British, 1762
" Cessation of hostilities between Great Britain and the U. States, 1783
" Slave trade abolished in France, 1794
" The Prince of Wales appointed Prince Regent, 1811
" Charles V. retires to a monastery, 1557
" Attempt of the French to invade England defeated, 1744
" War commenced between Russia and Sweden, 1808
" H. B. M. sloop of war Peacock, taken by the Hornet, captain Lawrence, 1813
25. William Pinckney died, 1822
26. The Papal government suppressed by Napoleon, 1798
" Napoleon left Elba for France, 1815
28. Deerfield burnt by the French and Indians, 1703
" Fort Du Quesne taken by the English and Americans, 1758

USEFUL ARTS.

An Improved mode of making Plaster of Paris.

[Translated from the *Dictionnaire Technologique.*]

This plastic material is obtained by calcining and reducing to powder the native sulphate of lime, or gypsum. The sulphate of lime is known under the name of plaster stone, and is found, in general, on the upper parts of the secondary formations, but sometimes on the tertiary ones. In the first, it forms thick couches interposed with calcareous beds; in the second, it forms deposits, more or less extended, and accompanied by clay or marl; it is thus found in the neighbourhood of Paris, where it forms a considerable object of commerce; the department of the Seine alone consumes about five millions of hectolitres. It is also sent to many of the neighbouring departments, and is even imported to England.

The mode of procuring the native sulphate of lime is either by forming pits or galleries, as in other quarries. We remark, in quarrying the plaster stone, three principal varieties, the one in crystals, agglomerated into irregular masses; of this great quantities are got, containing about twelve per cent. of carbonate of lime; this is the stone which is commonly employed in making plaster to be used in buildings, and for improving the quality of soils. The second kind, formed of lamellar sulphate of lime, crystallized and nearly pure, is

found in tables, bisected at their bases by oblique and angled parellelograms; it is also met with in the forms of prisms and lentils, more or less large, isolated in groups or rosettes, and also in the form of the heads of lances; it is yellow, and as clear as water. It is used for making the finest plaster, which is employed for making moulds and casts, and in stucco. The third variety, used in the arts, is found in homogeneous masses, semi-transparent, white, but containing yellow zones: it is capable of acquiring a greater degree of hardness, by a slight baking, and of receiving different tints. This substance, which is known by the name of alabaster, is made into vases, and various other ornamental objects; but it must not be confounded with the alabaster of the ancients, which was a crystallized carbonate of lime, of a yellow colour, veined, and capable of receiving a high polish.

We also find in nature a kind of anhydrous sulphate of lime, but as it is not capable of becoming solidified with water, so it is not employed. A bluish silicious variety, which is found in Italy, is employed in making chimney-pieces, pavements, &c.

It is the crude sulphate of lime, which, disseminated in great abundance in the soil of Paris, and the surrounding heights, communicates to the water in the wells of this city, that selenitic quality, which renders it improper for the purposes of washing and boiling vegetables. We may, indeed, in part, remedy this inconvenience by decomposing the sulphate of lime, with which it is nearly saturated, by the subcarbonate of soda, which precipitates the lime in the state of a carbonate: it will require nearly 250 grammes of the subcarbonate of soda for 100 litres of water, admitting that this contains the three hundredth part of its weight of sulphate of lime.

Baking the plaster.—They use for baking the plaster, many sorts of furnaces; but that which is most commonly employed consists of a rectangular building of from eight to ten feet square, and about nine feet in height, formed of three walls, built either of bricks or rough stones, of from sixteen to eighteen inches in thickness, terminated by a vaulted arch, and covered by a roof at the distance of two feet.

They construct across the mouth, or open front of this building, with plaster-stone, several parallel rows of vaults, employing for this use the best shaped stones; they then cover these vaults with more plaster-stone, first using the larger pieces, then smaller ones, and, finally, covering the whole, near to the vault, with the smallest pieces, and the dust formed in breaking the plaster-stone. They then place underneath the vaults formed in the plaster-stone, either some bavins of dry wood, or billets, or fagots, according to the locality. The flames penetrate though the vaults, and the stones which

surmount them; but they finally escape through flues made in the wall opposite to the front of the furnace, near the chimney.

Lime-kilns, where the calcination may be continued without intermission, without employing wood, but pit coal, may also be used, in various localities, for baking plaster.

Whatever may be the mode of constructing the furnace adapted for this operation, we may remark great variations in the quality of the plaster obtained; in fact, those parts of the stone which are nearest to the fire, in consequence of the temperature being too great, begin to undergo an igneous fusion, which renders the plaster incapable of imbibing water, like the native anhydrous sulphate of lime. Also, in the middle of the same stones, and especially in the centre of those which are the farthest removed from the fire, we always meet with a nucleus, more or less great, of crude, and, consequently, inert plaster. We may readily conceive that a mixture of the parts which are too much calcined, with others that are too little baked, in different proportions, must yield a product of a greatly variable quality. It, indeed, sometimes happens that the whole quantity in a furnace is either too much or too little baked, and thus furnishes a plaster unfit for use, and which the builders refuse to employ, and with reason. In this case, the purchaser is generally obliged to mix the bad plaster, in various proportions, with that of a better quality.

We may readily conceive that from these causes we most generally obtain plaster of an inferior quality, I have occupied myself in searching for the means of constantly producing plaster of the greatest degree of hardness, and have to remark—

First. It has hitherto been thought that it was the lime, in certain varieties of the plaster, which augmented its hardening quality, when mixed with water. But, in fact, the temperature most fit for calcining it, appears from my experiments, to be much lower than that usually employed in the decomposition of carbonate of lime; and if this latter substance concurs in ameliorating the quality of the plaster, in some of the processes in use, it is probable, that from its interposition, it facilitates the transmission of the heat, and hinders, in part, the ill effects of calcination at two high a temperature; and it appears that the granular carbonate is harder than plaster, as used in various mortars.

Secondly. In various parts of the ordinary furnaces, the calcination, being unequal, produces great differences in the usual properties of the plaster obtained, and nearly all the kinds produced are defective, either from the excess or defect of the temperature.

Thirdly. In fact, the interior parts of the calcined stones contain crystals, either not altered, or incompletely deprived of their water

of crystalization, and are thus deprived of the properties we seek for in this plastic material.

These preliminary remarks lead me to suppose that the degree of temperature fit for the baking of plaster, is considerably less elevated than that generally employed, and indeed I was not long in ascertaining the fact, by the following experiment.

I reduced into coarse powder some of the plaster-stone from Montmartre, and exposed it on the outside of a tube, to the heat of a continued current of high-pressure steam, at 105 degrees, as it passed through the tube. At the end of six hours I ground this powder fine, and knew, upon mixing it with water, that it had acquired the property of solidifying with greater energy than plaster of the same sort, baked in a furnace in the usual manner. Wishing to know the limit of temperature at which the native sulphate of lime in powder lost its water of crystalization, I tried successively the effects of still lower temperatures, and found that at 80 degrees of the centigrade thermometer, the plaster obtained solidified with water, whilst the fragments of impure plaster, in small lumps, were not sufficiently calcined at 95 degrees; and, in fine, that the regular crystals of sulphate of lime, exposed to the same temperature, were only partially desiccated; the effect not penetrating to any great depth.

These facts permit me to hope that we may now be able to treat plaster-stone, in the large way, with regularity, and thus constantly obtain this plastic material of the best quality. In fact, as the whole question of baking the plaster is now reduced to a simple desiccation, easily effected by steam, so all the difficulties hitherto experienced, from the bad construction of the furnaces, whether heated by wood, pit-coal, or turf, may be made to disappear.

We can also thus usefully employ the enormous quantities of plaster-stone in powder, which now encumber the quarries; as it would be proper, henceforth, either to crush the stone into small fragments, or, still better, to grind it to a coarse powder in mills, before baking it. This first labour would not be lost, as the baked plaster might be sifted, and directly employed without being subjected to pounding or beating, an expensive operation, and which always causes the loss of a great quantity of the material.

A perfect regularity in heating the plaster-stone may be attained by means of steam; using an inclined plane, formed of cast iron tubes, flattened at top, and communicating with each other at their ends. The steam-tube is to be connected with an ordinary high-pressure steam-boiler, and so disposed that the condensed water may return again into the boiler. A manometer (or steam-guage) must be placed on one of the tubes to indicate the pressure of the

steam, and to regulate the temperature accordingly. A pipe with a stop-cock must be placed on one of the most elevated parts of the tubes, in order to permit that air to escape which might oppose the constant communication of the steam. We could also employ a set of cast-iron plates, which might be covered with plaster-stone to be baked upon the steam-tubes, and be removed when that operation has been performed, and replaced by others in constant succession.

Whatever has been the mode of baking adopted, we must carefully prevent the plaster from being exposed for a long time to the air, and especially when it is moist, as it would absorb the water again by degrees, and thus become incapable of hardening when we would employ it, and, in fact, will have become an inert powder.

To use this plaster we have only to add to the powder a sufficient quantity of water, when it will directly assume the consistence of ordinary mortar, and must be mixed up with a trowel.

The fine plaster, mixed with a solution of glue, and having afterward various hard and coloured substances incorporated with it, forms the basis of one of the processes employed in the making of stucco, to imitate marble. Plaster is also employed in buildings, and in moulding objects of sculpture: it serves to decompose the ammonia, in the manufacture of sal ammoniac, and great use is made of gypsum in agriculture. P.

ARTIFICIAL PEARLS.

From the Dictionaire Technalogique.

These are small globules, or pear-shaped bulbs, blown in thin glass, and each pierced with two opposite holes, by which it may be strung. These are afterwards prepared in such a manner as to greatly imitate the rounded and brilliant concretions, reflecting the iridescent colours, which are found in certain bivalve shells, such as the pearl muscle, &c., and which bear the name of oriental pearls.

We can perfectly imitate the brilliancy and reflection of these natural pearls, by means of a liquid termed essence of pearl, and which is prepared by throwing into liquid ammonia the brilliant particles which are separated, by friction and washing, from the scales of a small river fish, named the bleak.

These pearly particles, thus suspended in the ammonia, can be applied to the whole interior of these glass bulbs, by throwing it

into them; after which the ammonia is volatilized by gently heating them.

It is said that some manufacturers do not employ the ammonia; but instead thereof, suspend the pearly particles in a solution of isinglass, well clarified, and which they drop into the bulbs, and then turn them in all directions, in order to spread it equally over their interior surfaces. There can be no doubt, that in this mode of applying the pearly mixture, the same success will be obtained as in the beforementioned process, and that it will afford a layer of the same thinness and brillancy.

It is important, to succeed in the perfect imitation of pearls, that the glass bulbs, or pears employed should be of a slight bluish tint, opalized, and be also very thin, and likewise that the glass should contain but little potash, or oxide of lead. In each manufactory of these artificial pearls, there are workmen exclusively employed in the blowing of these glass bulbs, and which indeed requires a great skill and dexterity to succeed well therein; a dexterity, indeed, which can only be acquired by long practice.

The French manufacturers of the artificial pearls have at length attained a degree of perfection before unknown. We must add, that the bulbs are finally filled up with white wax.

L. R.

OIL OF BIRCH BARK.

The Russians obtain this oil by filling a large earthen pot with the thin, whitish, paper-like, external bark of the birch tree, carefully separated from the coarse bark, closing the mouth of this pot with a wooden bung, pierced with several holes; and then turning it over, and luting it with clay to the mouth of another of the same size. A hole being dug in the ground, the empty pot is buried in it, and a fire is lighted round and over the pot containing the bark, which is continued for some hours, according to the size of the pot. When the apparatus is cooled and unluted, the lower pot contains the brown oil, mixed with pyroligneous tar, and swimming on an acid liquid.

In some places iron is used for this purpose, and the bark is hindered from falling into the lower pot by a plate of iron, pierced with holes; 100 pounds of bark yield about 60 of oil.

This oil is used in Russia for currying leather, to which it gives a peculiar odour, and a power of resisting moisture, far beyond any other dressing. Its use seems to have arisen from observing that the

thin, paper-like leaves of birch bark remained after the coarser part of the bark and the timber of fallen trees had rotted. The oil appears to owe this quality to a resin, which, by this mode of distilling, per descensum, is allowed to escape in a great measure from the action of fire, and drop into the lower pot. *Operative Chemist.*

GEMS ALTERED BY ART.

Lapidaries are accustomed to improve and change the colours of gems by exposing them to heat, and other chemical agents. Indian yellow cornelians are put into an earthen pot, covered with dry goats' dung, and heated for 12 hours, by which they are changed into a fine red. Instead of goats' dung, sand may be used. Black rock crystal is rendered colourless by heat, if continued for some hours; otherwise it will be only yellow. Bacquet made a chemical distinction between rock crystal and quartz; the latter cracking by heat, probably on account of containing water. The amethyst, by a moderate heat, becomes colourless; but if the heat is violent, white and shotten, like an opal; it is more liable to crack in the fire than rock crystal. Beryl is changed by a moderate heat to a light blue; if the heat is greater it becomes like mother of pearl. The emerald acquires the same pearly lustre by heat. The colour of crysoberyl is not altered by heat. Blue fluor spar is changed to red, and if the heat is strong is often rendered colourless. Agates absorb oil, either by being immersed or boiled in it for a sufficient time, or even during the process of cutting them—and on boiling them in oil of vitriol, the parts which have absorbed the oil are rendered black, while the other parts retain their natural colour, or even become whiter than before.

Agates and cornelians having carbonate of soda applied to them, and then exposed to the heat of a furnace, under a muffle, an opake white enamel is thus made to cover the stone, which cannot easily be ditinguished from a natural white flake. By this means are produced the cornelian beads brought from India, which are ornamented with net work of a white colour, penetrating to a small depth, and equally hard as the stone itself. *Ibid.*

GLASS BEADS

The following account of the manufacture of glass beads, carried on very extensively at Murano, near Venice, is given by Drs. Hopper and Hornschuch, in the journal of their tour to the Adriatic sea.

The furnaces for the white glass are similar to what is seen in the common glass-houses; but they mix with this white glass peculiar colouring substances, of which they make a great secret. The coloured glass being reduced to a melted state, a certain quantity is taken up by the blow-pipe used by the workmen, and is blown hollow; a second workman lays hold of the other end of the glass ball, and both run with great expedition opposite ways, and thus cut the glass into pipes, the thickness of which differ in proportion to the distance. A long walk of 150 feet, like a rope-walk, is attached to the glass-house for this purpose.

As soon as the pipes are cooled, they are divided into pieces, all of the same length, sorted, packed in chests, and sent to the bead manufactory at Venice. Striped pipes are made by taking two lumps of glass from pots of different coloured glass, twisting them together, and then drawing out the whole to the proper length. They also manufacture pipes three feet long, and of the thickness of a finger; these have a ball blown at one end, and are used to tie up plants in flower-pots.

When the pipes arrive at the bead manufactory, a person picks out pipes of the same thickness, which he cuts into small pieces of the size he thinks necessary. For this purpose a small sharp iron, in the shape of a broad chissel, is fixed in a wooden block; the workman places the pipes of glass on the edge of this tool, and with a chissel-like tool in his right hand, he cuts, or rather chips the pipes into the sizes that are proper for the various size beads.

The fragments of the pipes are then put into a mixture of sand and wood ashes, and are stirred until the hollow of all the pipes are filled, in order to prevent their sides from running together by the heat of the fire. They are then placed in a vessel with a long handle, more sand and wood ashes are added, the whole placed over a charcoal fire, and stirred continually with a spatula: by this simple means they acquire a globular figure. The sand and wood ashes are then separated by sifting, and the beads themselves sorted by other sieves into different sizes. Each size is then strung upon threads, made up into bundles, and packed ready for exportation. The beads made at this manufactory are sent off in large quantities to all parts of the world, and particularly to Spain and the coast of Africa.

NATURAL HISTORY.

THE ORNITHORHYNCUS.

Duck-bill of New-Holland.

Few of the animal race, which modern discoveries have brought to light, have excited as much inquiry as the paradoxical quadruped which is usually denominated the Duck-bill of New-Holland, or the Ornithorhyncus of naturalists.—This latter name was first devised by Blumenbach to designate the most remarkable feature which characterises the animal, that is its bill, which, in form and texture, is much like that of a duck. It is not a little singular that an animal which in other external appearances, such as its four legs, and body covered with fur, resembles a common quadruped, should differ so much in some particulars as to approach in affinity to another race of beings wholly opposite and dissimilar in their conformation. Such, however, is the fact, and the shores of New-Holland, the discovery of which has added so many treasures to the store of the natural sciences, bear incontrovertible evidence of the existence of an animal which unites these remarkable anomalies. In this island, or continent, they exist in considerable numbers around Port Jackson. They are always found in or near the water, into which they dive, and swim about with great activity, often rising to the surface to respire. Though the water appears to be their native and favourite element, they make their way on land without apparent difficulty. In size the duck-bill is small, and its body is elongated, and covered like a quadruped, with fur, which is composed of strong rigid hair, and a soft, silky wool, imper-

vious to moisture. Its tail is strong, flat, and not unlike in shape to that of the beaver, though it is covered with the fur and skin of the body. Its legs are short, fleshy and strong. The forefeet are divided into five toes, connected by a web, or membrane, which appears to be an enlargement of the skin of the palm, and projects beyond the claws, which are free. The head of the animal is peculiar, from its remarkable termination in a horny bill, very similar to the mandible of a bird. This bill is flattened and elongated like that of a duck, and its edges are furnished with teeth. The teeth, or what appears to be substitutes for the masticatory organs, are situated far into the mouth, have no roots, nor are they sunk into the jaw, like other teeth, but seem to be callosities, or bony tubercles. There are two of them in each jaw, upper and under, and right and left. The tongue is broad, soft, fleshy, and has its border covered with strong papillæ, or glandular prominences. The nostrils are situated toward the extremity of the upper mandible. The eyes are small and lateral. The hind legs are armed with horny spurs, which are sharply pointed, and curved in the conical shape which these appendages assume in some of the tribes of birds. This spur answers a double purpose, as enabling the animal to inflict a wound with its sharp point, and as being terminated in a duct which is connected with a reservoir containing a fluid of extremely venomous properties. As a weapon of defence, this spur is a powerful instrument, and in fact appears to be the sole means of protecting itself against the attack of its foes, as its soft, horny bill seems entirely insufficient for offensive operations, and simply as an alimentary organ, subserving the same purpose as the bill of an aquatic bird in enabling it to search in the mud for its food. The natives of the region where the duck-bill abounds, report of the wound which it inflicts with its spurs, that notwithstanding its painfulness, and the inflammation which it occasions, no dangerous or fatal consequences follow from it, and that its effects soon cease after the wound is either sucked with the mouth, or washed with fresh water.

These animals are sometimes taken on land, and when pressed they endeavour to effect their escape by striking with their hind feet and using their spurs against their adversaries.—From the curious structure of its mouth it would seem that the young animal could not receive its nourishment in the manner usual with other animals of the mammiferous class, that is by sucking the milk of their dam; and the absence of mammæ or teats in the female would appear to corroborate this supposition. Hence the accounts of the natives of the places named as the habitations of the Duckbill have obtained credence, that the animal is oviparous, or produces its young by means of eggs. For this purpose it forms its nest among the reeds of the

marshes partially covered with water. In this nest the female lays two eggs of a whitish colour, and as large as those of a hen, and she sits for a long time until they are hatched, seldom quitting the nest, and then only when compelled by force or hunger.

From the singularity of structure which distinguishes this animal it has exercised the ingenuity of several eminent naturalists to assign to it its proper place in the scale of organized beings. In the form of its bill and its spur it approximates to the birds; and its oviparous habit, if such is actually true, as has been reported, further indicates its affinity to that class. Some of these, and other traits, however have induced the belief that it belongs to the reptiles; and Home and Dumeril have supported that opinion.—But on the whole, notwithstanding the discrepancies in its habits from the rest of the mammiferous animals, the totality of organization appears to secure it a place among these races. Cuvier, under this impression, and from the form and structure of its teeth, places it as a distinct and peculiar family amongst the edentate animals, or those which have no cutting or canine teeth. Blainville arranges it along with the marsupial animals, or such as have an abdominal pouch, in which the young are nourished and protected, such as the opossum of our country. The bones which are peculiar to this race of animals are discoverable in the ornithorynchus although no developement of the skin of the abdominal pouch has been observed.

The Duckbill, which has excited so much inquiry among naturalists, has of late years been brought to Europe and specimens of the preserved skin are not unknown in this country; a good specimen exists in the excellent zoological cabinet belonging to the museum of Mr. Cozzens of this city.

AMBER.

By Dr. Feuchtwanger.

Amber, Succinum, Latin—Bernetein, German. The Latin term for this substance would seem to imply that it was supposed to originate from fossil juice. Its Arabic name is constituted of *Kah*, to draw, and *Rubah*, straw, indicating its electrical power to attract straw, and other light substances. Amber is a combustible body, and is classed among the bituminous minerals, Its colour is generally either white or yellow, varying in different shades between both, as yellowish white, wax. or honey yellow, brownish or redish yellow. It is chiefly semi-transparent, sometimes translucent, but never perfectly opake. Among its other mineral characters it has a

resino-vitreous texture, conchoidal fracture, and a glassy lustre, and its specific gravity is 1.065 to 1.100. It burns with a yellow flame and little smoke; does not become very liquid, and emits a very agreeable odour. In a dry distillation it melts at 517 deg. Fahr., and produces an *acid*, which is called Succinic acid, *water*, which is impregnated with this and acetic acid, and an *essential oil*, known by the name of oil of amber, and at the end of the distillation a brown mass remains in the retort, which is used in varnishing. Oil of turpentine, and almost all other essential oils, may be used for procuring the resin from the amber. Fat oils dissolve the amber perfectly. Its elementary constituents are 80 per cent. of carbon, 8 of hydrogen, 7 of oxygen, and the remaining 5 per cent. of impurities.

Amber is used for many purposes of ornament, such as for the mouth-pieces of pipes, cane-handles, necklaces, &c., and also as an ingredient in the composition of incense. As it is not a very abundant substance, it is frequently adulterated, and in particular, gum copal is substituted, and palmed upon the ignorant for amber. This last substance is in many respects similar to amber—both become negatively electric by friction; have nearly the same specific gravity, (copal, according to Thompson, being 1.069,) and give out in burning a pleasant odour. Hence it is not easy to distinguish the one from the other, by attending merely to their external characters. One mode of making this distinction was pointed out by the Abbe Hauy, "if," says he, "a fragment of the amber be attached to the point of a knife, and inflamed, it will burn with some noise, and a kind of ebullition, but without liquifying so as to flow, and if it should fall on any flat surface it rebounds a little, whereas the copal, under similar circumstances, melts and falls in drops, which become flattened." But it appears to me that the simple instrument the Electrometer would be sufficient to discriminate between the two substances with sufficient accuracy. The amber, on being rubbed, will excite the instrument about 10 deg. more than copal. It will also be distinguished by the following characters: If amber is brought before the fire, it requires a pretty high temperature for melting it, and produces no kind of ebullition; copal, however, liquifies easily, burns with much smoke, and decrepitates more than the amber.

Amber is found either thrown out by the sea, or in the small rivers near it; sometimes in alluvial deposits of land or gravel in the vicinity of the sea, or in bituminous formations, such as lignite, bituminous wood, or jet, where crystalized minerals are at the same time fouud, such as iron pyrities, &c. Its geological situation belongs, therefore, to the upper secondary formation, that is between diluvial and chalk, or greensand formation; or, according to de la Beche's

classification, to the stratified rocks between the third and fourth large group.

Amber is never found in a crystalized state, but always granular, or in knots, from the size of a small pebble to that of a man's head. One of the largest specimens known was found in 1811, on the Baltic coast, measuring fourteen inches in length, by nine in breadth, and weighed twenty-one pounds.

A remarkable specimen is mentioned as having been found on the African coast, (or, according to some, in one of the West India islands,) by a sailor, and whose size was in length eighteen inches. It was said that the discoverer accidentally seated himself on the piece he had found, which after a time was so excited by the heat of his body, that he became strongly attracted to it, and could not, without some difficulty, detach himself from it. I have in my own possession a mass of wax yellow amber, which is sixty cubic inches in magnitude, and weighs nearly two pounds. Its nodular appearance, and other evidences, seem to indicate that amber is originally in a liquid state—one proof of this appears to be derived from the experiments of Dr. Brewster, who states that to polarized light it exhibits the same features as a gum, or vegetable resin. A further proof is found in the various substances which are always found enclosed in its mass, such as vegetable fibres, or lignite, leaves and stems of trees. These last are supposed by Blumenbach to belong to a plant now known to exist in Cochin China, called the *aloexylon agallochum*, producing a hardened gum, which is in some characters similar to the amber, and insects, such as ants, flies, spiders, and other races, of various kinds, are found occasionally embedded in amber.

Amber is a production which is not restricted to any particular district, being found all over the world. The most considerable quantities are procured from the shores of the Baltic, in Prussia, particularly from Memel to Dantzic, where it is collected in several different methods. Sometimes it is found by the inhabitants in the small rivers near the sea, or at the sand-beds, where it is thrown out by the sea. Fishermen are sometimes employed to seek for it, and those people become very expert in the course of their practice, and learn from certain indications where the amber is likely to be found. They are provided with a dress of leather for the purpose, with which they wade into the water as high as their necks, searching for the amber which floats, or is suspended at various depths in the water.

The ancients, as is well known, were acquainted with this substance, and such pieces as happened to enclose an insect, or other curious object, were considered of high value. We are told that the

ancient Phenicians, in search of amber, penetrated in their frail vessels as far as the Glessary Islands, situated in the Cimbric chersonese, or Baltic; and Tacitus mentions that among the ancient Germans, amber was called *glessum*, a term which in the Latin was synonymous with glass.

ON GOLD.

By the same.

Gold has been known since the earliest ages of antiquity. Its yellow colour sufficiently characterizes it, its great specific gravity which is 19,200 to 19,650, its malleability which is greater than any other metal, and its inalterability by atmospheric air, water, alkalies and most acids. It occurs in a chrystallized form as that of a cube, octahedron, dodecahedron, trapezoedron, hemitrope, &c. It also assumes several other shapes as dendritic, capillary, reticulated, foliated, compact, laminated, or granular such as it is found in the sands of rivers. It is frequently found united with other metals such as copper, silver, antimony, mercury, tellurium and selenium. The most common process for separating the gold in its purest state, that is the common gold or commercial gold ore, is by dissolving it in nitro muriatic acid. The solution is filtered and mixed with a solution of proto sulphate, or proto muriate of Iron. In this experiment the iron attracts the oxygen from the gold and precipitates it in the state of fine metallic powder which can be melted to a regulus with or without borax. Granular gold, or such as is found in rivers, is first levigated by machines proper for the purpose and then either amalgamated with mercury by means of trituration, the amalgam is then separated from the mercury by distillation, or the gold is melted with nitre, borax, &c., or it may be combined with lead, and the lead afterwards driven off. But if the gold is in combination either naturally or as an alloy with another metal such as silver or copper, it is necessary to resort to the process called cupellation, or quartation. The cupel is a shallow crucible usually of a half cylindrical form, made of burnt bones or phosphate of lime. The gold is put into the cupel with a proper proportion of lead, and placed in a muffle or earthen oven in a furnace when the fusion takes place. The metals remain some time in a fluid state, the lead vitrifying and dissolving the other metals besides the gold or silver. This fluid glass soaks into the cupel and both the metals silver and gold are left in a state

of purity. Certain colours appear on the surface of the globule which soon afterwards appears of a great brightness and lustre, and this state of it is known by the workmen by the name of brightening and indicates the separation to be complete. The cupellation of gold merely separates it from what are called the imperfect metals, but silver or platina may remain after it. In this case another process is necessary called the quartation or parting. Three parts of silver are added to the gold, and the gold composition forms only a fourth part of the whole mixture, which is then fused. The operation of quartation is necessary in this stage for the purpose of enabling the nitric acid, which is afterward to be used to act by separating the particles of the gold from each other, so that they may not defend the silver from this action. The mass is then hammered, or rolled out thin, and subjected to the action of boiling nitric acid, of a proper strength. The acid is poured off, and another washing is again added, of a different degree of strength, and repeated until all the silver is dissolved, and the pure gold left behind in a porous mass, or in the form of powder. Besides this mode, nitro-muriatic acid may be employed, which dissolves the gold, and leaves the silver behind as a muriate. The gold can also be parted by antimony.

Gold requires a high degree of heat to fuse it. It melts at 32 deg. of Wedgwood's pyrometer, or about 1300 deg. of Fahr. Powerful burning mirrors have volatilized it, and it has been driven up in fumes in the metalic state by a flame urged upon it by a stream of oxygen gas. It does not oxydize or suffer other alteration unless by the action of the electric fire, which converts it into a purple oxyde. It is the most malleable and ductile of all the metals—a grain of it may be drawn out into a wire of 500 feet in length, and can be beaten out into a leaf which will cover nearly 57 square inches. The manner in which gold leaf is prepared for its various uses in the arts, consists in hammering a number of thin rolled plates between skins, or animal membranes. The wire which is used by lace-makers, is obtained from an ingot of silver, previously gilded, which is then drawn out, so that the coat of gold is less than the twelfth part of the thickness of gold leaf, which of itself is found to be about 1-282,000 of an inch in thickness.

Most metals unite with gold by fusion, and form an amalgam with it. Mercury is very strongly disposed to form such an union, and renders the amalgam softer in proportion as a greater quantity of mercury is used. Lead also unites with it, and renders it extremely brittle. With iron it forms a grey mixture, which is said to be very hard, and superior to steel for fabricating cuttlery. Zinc, when combined with gold, produces a metal which is susceptible of a fine polish, and hence is well adapted to form mirrors for reflecting te-

lescopes. The most common, and perhaps useful alloy for gold, is copper, which, by rendering the gold less ductile, harder, more fusible, and deepening its colour, fits it for coining, and other uses for which it is so extensively employed. One of the most interesting combinations of gold, is that with ammonia, which precipitates its solution with the aqua regia. This precipitate forms the aurate of ammonia, or fulminating gold, which detonates on being rubbed gently or pressed, and sometimes very dangerous explosions take place from an incautious use of the preparation. Gold combined with tin forms a very useful mixture for producing a beautiful purple for colouring glass, porcelain, and for making enamels. Tin, indeed, has such an affinity for gold, that a single grain of gold will tinge with a brownish hue a solution of the protomuriate of tin, containing 40,000 grains, and it is therefore considered as one of the best tests for detecting gold.

Gold, in some of its forms, is found in almost all parts of the world. The beds of many rivers contain auriferous sand, probably derived from the disintegration of rocks containing the metal, near which the rivers flow. It occurs in small quantities in what are termed gold mines, in various parts of the globe. Spain was formerly celebrated for these mines. The province of Asturia furnished considerable quantities in ancient times, and Diodorus Siculus, Pliny, and others, mention the profitable trafic which was carried on by the Phenicians and Romans. The principal mines of any importance in Europe, are those of Hungary and Transylvania, though there is scarcely any province of that continent which does not produce this metal in a greater or less degree. In Asia, gold is also commonly found in most parts, particularly in the southern districts, and in the islands, as at Japan, Formosa, Java, Borneo, Sumatra, the Philipine and other of the Indian Archipelago. Africa, as is well known, supplies the gold dust of commerce, which is principally extracted from the granular metal found in river sand. It is, however, to America that modern times is most largely indebted for its chief supply of gold. Brazil is rich in this metal, and this province furnishes perhaps the largest quantity for commerce. Of late years the the southern parts of the United States have contributed considerble proportions of this precious metal.

If appears from the report of the United States Mint, for the last year, that the amount of gold coined within that period, was—in

Half eagles, - - - - - - -	$631,755
Quarter Eagles, - - - - - -	11,350

Of this sum, there were derived from Mexico, South America, and the West Indies, - - - - - - $125,000

From Africa, - - - - - - - - 19,000

From the gold region of the U. States, about - 466,000
And from sources not ascertained, about - - 38,000

Of the gold of the United States, abovementioned, $24,000 may be stated to have been received from Virginia, $204,000 from North Carolina, $26,000 from South Carolina, $212,000 from Georgia. In the last annual report, the progressive developement of the gold region of the United States was illustrated by referring to the increase of the annual receipts from North Carolina, which previously to 1824, had been inconsiderable, but from that year to 1829, inclusive, had advanced from $5000 to 128,000, and also to the novel occurrence of gold having been received at the mint from Virginia and South Carolina—about $2,500 having been received from Virginia, and $3,500 from South Carolina.

The past year exhibits, in relation to all these states, a conspicuous increase in the production of gold, and presents also the remarkable fact of $212,000 in that metal being received from Georgia, from which state no specimen thereof had been presented at the mint in any previous year.

The most useful alloy for gold is that with copper, which supplies the mixture used in coining. The mode which is common in estimating the relative quantity of this alloy is called caratation. For this purpose, in expressing the fineness of gold, the whole mass spoken of is divided into 24 carats of twelve grains each, either real or merely proportional, like the essayers weights. Thus, if the gold is said to be 20 carats fine, it is understood that four parts are alloy, and twenty pure gold. The proportion of this fineness or purity of the gold to the alloy varies in every country where gold coinage is used. The Austrian ducat is perhaps the finest gold worked up in coin, containing 23 car. 9 grains, and the Holland ducat contains 23 car. 7 gr. In France, it varies from 20 to 22 car. The English gold coins are 22. Our American, same.

THE GRISLY BEAR.

The following account of the most ferocious of American quadrupeds is taken from Dr. Richardson's recent Zoology of the North part of British America.

"The strength and ferocity of the Grisly Bear are so great that the Indian hunters use much precaution in attacking them. They are reported to attain a weight exceeding eight hundred pounds, and Lewis and Clark mention one that measured nine feet from the nose to the tail, and say that they had seen a still larger one, but do not

give its dimensions. This is far above the usual size of other Land Bears, and equals the larger specimens of the Polar Bear. Governor Clinton received an account of one fourteen feet long, from an Indian trader, but even admitting that there was no inaccuracy in the measurement, it is probable that it was taken from the skin after it was taken from the body, when it is known to be capable of stretching several feet. The strength of this Bear may be estimated from its having been known to drag to a considerable distance the carcass of a buffalo, weighing about one thousand pounds. The following story is well authenticated. A party of voyagers, who had been employed all day in tracking a canoe up the Saskatchewan, had seated themselves in the twilight by a fire, and were busy in preparing their supper, when a large Grisly Bear sprung over their canoe, that was tilted behind them, and seizing one of the party by the shoulder carried him off. The rest fled in terror, with the exception of a Metif, named Bourasso, who, grasping his gun, followed the Bear as he was retreating leisurely with his prey. He called to his unfortunate comrade that he was afraid of hitting him if he fired at the Bear, but the latter entreated him to fire immediately, without hesitation, as the Bear was squeezing him to death. On this he took a deliberate aim, and discharged his piece into the body of the Bear, which instantly dropped its prey to pursue to Bourasso. He escaped with difficulty, and the Bear ultimately retreated to a thicket, where it was supposed to have died; but the curiosity of the party not being a match for their fears, the fact of its decease was not ascertained. The man who was rescued had his arm fractured, and was otherwise severely bitten by the Bear, but finally recovered. I have seen Bourasso, and can add that the account which he gives is fully credited by the traders resident in that part of the country, who are best qualified to judge of its truth from their knowledge of the parties. I have heen told that there is a man now living in the neighbourhood of Edmonston-house, who was attacked by a Grisly Bear, which sprung out of a thicket, and with one stroke of his paw completely scalped him, laying bare the scull, and bringing the skin of the forehead down over the eyes. Assistance coming up, the Bear made off without doing him further injury, but the scalp not being replaced, the poor man has lost his sight, although he thinks that his eyes are uninjured.

Mr. Drummond, in his excursions over the Rocky Mountains, had frequent opportunities of observing the manners of the Grisly Bears, and it often happened that in turning the point of a rock or sharp angle of a valley, he came suddenly upon one or more of them. On such occasions they reared on their hind legs and made a noise like a person breathing quick, but much harsher. He kept

his ground without attempting to molest them, and they on their part, after attentively regarding him for some time, generally wheeled round, and galloped off, though, from their known disposition, there is but little doubt but he would have been torn in pieces had he lost his presence of mind and attempted to fly. When he discovered them from a distance, he generally frightened them away by beating on a large tin box, in which he carried his specimens of plants. He never saw more than four together, and two of these he supposes to have been cubs; he more often met them singly or in pairs. He was only once attacked, and then by a female, for the purpose of allowing her cubs time to escape. His gun on this occasion missed fire. but he kept her at bay with the stock of it, until some gentlemen of the Hudson's Bay Company, with whom he was travelling at the time, came up and drove her off. In the latter end of June, 1826, he observed a male caressing a female, and soon afterward they both came toward him, but whether accidentally, or for the purpose of attacking him, he was uncertain. He ascended a tree, and as the female drew near, fired at and mortally wounded her. She uttered a few loud screams, which threw the male into a furious rage, and he reared up against the trunk of the tree in which Mr. Drummond was seated, but never attempted to ascend it. The female, in the meanwhile retiring to a short distance, lay down, and as the male was proceeding to join her, Mr. Drummond shot him also. From the size of their teeth and claws, he judged them to be about four years old. The cubs of the Grisly Bear can climb trees, but when the animal is fully grown it is unable to do so, as the Indians report, from the form of its claws. Two instances are related by Lewis and Clark, and I have heard of several others, where a hunter having sought shelter in a tree from the pursuit of a Grisly Bear, has been held a close prisoner for many hours, by the infuriated animal keeping watch below. The Black and Brown or even the Polar Bear ascend trees with facility. Some interesting anecdotes of contests with this Bear, selected from the narratives of Lewis and Clark, Major Long, and others, are related in Godman's Natural History, to which the reader is referred.

The Grisly Bears are carnivorous, but occasionally eat vegetables, and are observed to be particularly fond of the roots of some species of *psoralea* and *hedysarum*. They also eat the fruits of various shrubs, such as the bird-cherry, choke-cherry, and *hippophae canadensis*. The berries of the latter produce a powerful cathartic effect upon them. Few of the natives, even of the tribes, who are fond of the flesh of the Black Bear, will eat of the Grisly Bear, unless when pressed by hunger. Say and Gass mention a method which the Shoshonee or Snake Indians have of baking Bear's flesh in a pit

—ed with alternate layers of brush-wood and meat, and covered with earth,* which is nearly similar to the way in which the natives of the South-sea Islands prepare their dogs and hogs.

The Grisly Bear inhabits the Rocky Mountains and the plains lying to the eastward of them, as far as latitude 61°, and [illegible] perhaps still farther north. Its southern range, according to Lieutenant Pike, extends to Mexico. There is a Brown Bear on the Andes of Peru, but whether it is of this species or not is not known.† Lewis and Clark could not ascertain that the Grisly Bear at all inhabited the country between the western declivity of the Rocky Mountains and the sea-coast, and remark that those which they saw about the great falls of the Columbia were more variegated in colour, and of a milder disposition than those near the sources of the Missouri, but certainly of the same species. Mr. Drummond observes that the Grizly Bears are numerous in the woody country skirting the eastern base of the Rocky Mountains, particularly in districts which are interspersed with open praries and grassy hills. They vary, he says, much in colour, from a very light gray to a dark chestnut. The latter variety is commou about the sources of the Peace River, and, according to the Indians, is more ferocious ihan the gray one. The Black Bear, which inhabits the same districts, and frequently varies there to a cream-colour, never associates with the Grisly Bear.

THE MOLE.

Observations relating to the natural history of this animal have lately been made by M. Flourens, from which we make the following extract.

"Two moles were put into a vessel with earth at the bottom, and with roots of carrot and horse radish for food. The next morning only one mole was visible, the roots were not eaten, and on searching the earth the skin alone of the other was found. It was opened throughout its length, beginning at the belly, and the bones and flesh were eaten. The other mole was put into an empty vessel; it was exceedingly agitated and active, and appeared to be very hungry. A sparrow, without its wing-feathers, was put in to it, which at first pecked at the nose of the mole, when the latter ap-

* Cass's *Journal, &c.*, p, 311.

† Condamine's *Travels*, p. 82, Ulloa's *Voyage*, 461 (quoted from Arctic Zoology, p. clxx.)

proached it, but after two or three times, the mole darted on the sparrow, thrust its nose into the entrails of the bird, and detached the skin, at the same time devouring the flesh with a degree of fury. Putting a glass of water into the vessel, the mole drank abundantly once, and again during its meal on the sparrow. The remains of the sparrow being removed, the mole was left to itself; an hour after, it was lying quiet; in five or six hours it was very much agitated, and appeared exceedingly weak, its belly pressed inwards, its sides depressed, its appearance breathless, its snout in continual motion—it appeared starved, and ready to die. Another live sparrow was put toward the animal, who, this time, instantly jumped at it, and began to devour it, as heretofore, at the entrails. After eating a little it drank, became of its usual size, and remained quiet. Next morning a frog was put in, which the mole soon devoured, beginning at the anus, as before. The mole was then left until it was very hungry, when a toad was put in to it: it instantly perceived it, but each time it approached the toad, the latter swelled up and the former turned away his snout. Roots of carrot, cabbage, and lettuce, were then put in, and left to the mole all night. Next morning it was dead, and the roots scarcely touched.

Three other moles were put separately, with vegetable food, as leaves, roots, &c. One died without at all touching the food, and the other two died after slightly attacking the leaves, &c. only in search of animal food.

The mole therefore, is not an herbiverous animal, and only destroys roots to get at the worms, insects, and larvæ within, and is, in this respect, a most useful animal in a garden; indeed, we have often heard the remark made, but without appreciating the truth of it, that though gardeners were the worst enemies of moles, that moles were the best friends of gardeners. *Quar. Jour.*

HORTICULTURE.

EARLY CABBAGES.

(From Wilson's Economy.)

One method of raising early cabbages, is to have a hot-bed prepared, and all ready to sow the seed upon, on the 22d of February, or at any rate, between that and the first of March. Here it will be necessary to say a little about the nature of the materials proper for making the bed.

The proper dung for a hot-bed, ought to be collected from any place, where there are a sufficient number of horses kept, so as the daily cleanings of the stable will be able to maintain a constant and lively heat, in the whole heap, where their dung is deposited. In the loading and carrying of it, much of the rank steam passes off; still it may be turned over, and shaken well up, once or twice previous to making the bed, But, as cabbages and lettuce require but a very slight heat to raise them, the bed ought never to be made more than two feet high with dung; I seldom make mine more than eighteen inches. As to the making the bed, any man, that can load a dung-cart, can hardly err in this. The ground on which it is to be formed, is marked out, by driving down four stakes, one at each corner, on a scale six inches larger than the size of the frame. A layer of a few inches in thickness, of the longest of the dung, is shaken all over the bottom; another layer about the same thickness, of long and short, as it comes, is shaken all over the first, the whole well beat down, with the back of the dung-fork, its edges all neatly trimmed in correct lines; and in this manner, the operations are continued, until the bed is raised to a height of eighteen or twenty inches. If a layer of short shovellings can be scraped up, to finish the top, it will be all the better. Beat the whole neatly, all over, with the back of your dung-fork, to a true level. Place on your frame, and keep the sashes close, until the steam begins to rise, which will be about twenty-four hours; when some, or all of them, must be tilted an inch or two behind, to let it pass off. Such a bed is never apt to heat to any extreme; and, in a few days, it will be ready to receive the earth. This may easily be known, by thrusting your hand down some way into the dung; whenever it feels about the degree of

blood heat, you may earth it all over, to a depth of six or eight inches. A sufficient quantity of fine, light, dry good soil should be selected for hot-beds, in the fall, and deposited near where the bed is to be made, and covered over with a sufficient quantity of litter, or any thing to keep it from freezing. The next day after your bed is earthed, it will be fit for sowing. The sashes should be taken off and the soil made perfectly level and smooth, with a fine light rake. The seed should then be sown pretty thick, all over the surface, and with the back of a spade or shovel, pressed neatly into the earth. This is a process similar to the treading in of seeds sown in the open ground, and is of great importance in seeding a hot-bed. Then, with an iron sieve, sift just enough fine earth to cover the seed, all over the bed. In want of a sieve, you may sow it lightly, all over, with your hand. A good hand can easily fix and cover the seed with a rake, but it is a dangerous tool here, in the hands of one not well used to the handling of it. The sashes must be immediately put on, and well covered over, at nights, with mats, or board covers, or straw: and, in the day time, you must shade the bed from the rays of the sun, until the plants come up; and, at all times, if any steam appears, tilt a little, some of the sashes, to let it pass off; and at nights, or cold days, let a mat hang over, to prevent the keen air from entering directly into the bed.

I have never seen, nor heard, (except from Cobbett,) of the necessity of lining a hot-bed, for cabbage or lettuce. Should the weather prove very severe, or stormy, six inches of warm, but not burning dung, may be raised all around the outside of the frame, on the top of that part of the bed, which was for that purpose, if necessary, directed to project beyond the frame. This will sufficiently secure the bed from all external injury, and the plants will thrive better without any additional bottom heat. All that is afterwards necessary is, to give plenty of air, at all times, in good days; to cover well at nights, and keep the earth moderately moist, by frequent but gentle waterings.

It is a disagreeable pursuit, even for a gardener, to expose the errors of a fine writer, but a bad horticulturist; yet, the transplanting of cabbage plants, at the tenth of April, into a secondary hot-bed, as directed by Mr. Cobbett, in his 87th paragraph, exhibits such a degree of the man's ignorance of the art, and actual practice of gardening here, that it appears to be the duty of those, who are well acquainted with both, to use every fair and honorable means of warning their fellow-citizens of the danger of following the dictates of a man, who, whatever he may be, in other respects, proves to be so ill qualified for instructing others in an art, which his vanity seems to have led him to believe Americans were as ignorant of as himself.

Every body knows, that cabbages, as well as any thing else, may be grown to maturity by a constant aid of hot-beds, but this is avowedly not Mr. Cobbett's object. He says, he writes for farmers; and neither they, nor any body else, will ever make a-hot-bed, to set cabbage plants in, at a season of the year, when they will thrive, and grow to a great perfection, in the open ground. In the most backward season, I have ever seen, the timorous or indolent gardener never needed to delay the setting out of his early cabbages, beyond the twentieth of April. In the year 1817, I had two acres of ground in radishes, which, by the 18th of April, covered the ground with their foliage, and their roots were the size of a goose-quill. To have seen my cabbage plants, at that period, upon a hot-bed would have made Cobbett himself laugh heartily; and, as we are now in good humour, we shall dismiss this cabbage-headed contest, by advising our reader to set out his early plants, any time in the begining of April, but never to delay it beyond the middle of the month.

Had he condescended to visit the numerous market gardens, in the very vicinity of where he wrote, he might have seen hundreds ot thousands of cabbage plants, set out for good, with plants raised from seed sown the last of February, at the very period (the 10th of April) when he gives directions for making a new bed to forward and protect them.

TO DESTROY INSECTS ON FRUIT TREES.

In the transactions of the London Horticultural Society, it is stated that the following mixture applied to the branches of fruit trees has been found effectual in destroying the insects which harbour on them. Mix 1 lb. flour of sulphur in three gallons of gas water, adding soft soap enough to make the liquid adhere to the branches. This mixture is made over a fire without danger. It is to be applied to the trees in the month of March, by a common white-wash brush.

EDUCATION.

COMMON SCHOOLS IN NEW-YORK.

THE productive school fund of this state is stated by the superintendant of common-schools, to amount at present to $1,696,733 66; from which a revenue was received during the past year of $100,678 60. From the same source we learn that there are in the state 9062 school districts, in 8630 of which schools have been kept during the last year, by inspected teachers.

In the districts from which returns have been received, there are 497,503 children over 5, and under 17 years of age; in the same districts 499,424 scholars have been taught, during the year preceding the 1st of January, 1830, an average of 8 months.

The superintendant also states that since the year 1821, the average annual increase of the children between the age of 5 and 15 years, has been about 17,300; and the average increase of the number of scholars instructed, has been about 20,000 per annum.

During the year preceding the 1st of July, 1830, there were $229,713 36 received by the commissioners of the towns, and apportioned to the districts which had made returns. Of this sum, $100,000 were paid from the State treasury, $124,556 04 were raised by tax on the teveral towns, and $14,095 32 were derived from local funds, possessed by certain towns. There is now $83,463 85 in the treasury, belonging to the school fund, which is to be vested in some of the stocks of the state.

COLLEGES IN THE UNITED STATES.

Names.	Place.		Presidents.	Founded.
Bowdoin,	Brunswick,	Me.	Wm. Allen,	1794
Waterville,	Waterville,	do.	Jer. Chaplin,	1820
Dartmouth,	Hanover,	N. H.	Nathan Lord,	1770
Univ. of Vermont,	Burlington,	Vt.	James Marsh,	1791
Middlebury,	Middlebury,	do.	Joshua Bates,	1800
Harvard University,	Cambridge,	Mass.	Josiah Quincy,	1638
Williams,	Williamstown,	do.	Ed. D. Griffin,	1793
Amherst,	Amherst,	do.	H. Humphrey,	1821
Brown University,	Providence,	R. I.	F. Wayland,	1764

Names.	Place.		Presidents.	Founded.
Yale,	New-Haven,	Conn.	Jer. Day,	1700
Washington,	Hartford,	do.	T. C. Brownell,	1826
Columbia,	New-York,	N. Y.	W. A. Duer,	1754
Union,	Schenectady,	do.	E. Nott,	1795
Hamilton,	Clinton,	do.	Henry Davis,	1812
Geneva,	Geneva,	do.	R. S. Mason,	1823
College of N. Jersey,	Princeton,	N. J.	J. Carnahan,	1746
Rutgers,	N. Brunswick,	do.	P. Milledoller,	1770
Univer. of Pennsylv.	Philadelphia,	Penn.	W.H. De Lancey,	1755
Dickinson,	Carlisle,	do.	S. B. Howe,	1783
Jefferson,	Canonsburg,	do.	M. Brown,	1802
Western University,	Pittsburg	do.	R. Bruce,	1820
Washington,	Washington,	do.		1806
Alleghany.	Meadville,	do.	Timothy Alden,	1815
Madison,	Union Town,	do.	H. B. Bascom,	1829
St. Mary's,	Baltimore,	Md.	E. Damphoux,	1804
Columbian,	Washington,	Ca.	S. Chapin,	1821
William and Mary,	Williamsburg,	Va.	Adam Empie,	1693
Hampden Sydney,	Prince Ed. Co.	do.	J. P. Cushing,	1774
Washington,	Lexington,	do.	G. A. Baxter,	1812
University of Va.	Charlottesville,	do.	James Madison,	1819
University of N. C.	Chapel-Hill,	N. C.	J. Caldwell,	1791
Charleston,	Charleston,	N. C.	Jasper Adams,	1785
College of S. C.	Columbia,	do.	T. Cooper,	1801
Univer. of Georgia,	Athens,	Georgia.	A. Church,	1785
Greenville,	Greenville,	Tenn.	Henry Hoss,	
Univer. of Nashville,	Nashville,	do.	Philip Lindsley,	1806
E. Tennessee,	Knoxville,	do.	C. Coffin,	
Transylvania,	Lexington,	Ken.	Alva Woods,	1798
Centre,	Danville,	do.	G. Blackburn,	1822
Augusta,	Augusta,	do.	Martin Ruter,	1823
Cumberland,	Princeton,	do.	F. R. Cossit,	1825
University of Ohio,	Athens,	Ohio.	R. G. Wilson,	1802
University of Alabam.	Tuscaloosa,	Ala.	—— ——,	1819
Wesleyan College,	Middletown,	do.	—— ——,	
Jefferson College,	Washington,	Miss.	—— ——,	1802
—— College,	Jacksonville,	Il.	—— ——,	1829
Miami University,	Oxford,	Ohio.	R. H. Bishop,	1824
Western Reserve,	Hudson,	do.	—— ——,	1826
Kenyon,	Gambier,	do.	P. Chase,	1828
Bloomington,	Bloomington,	Ind.	A. Wylie,	1828

EDUCATION IN PRUSSIA.

Notwithstanding the government of Prussia is that of an absolute monarchy, there is no country in Europe more distinguished for its liberal patronage of learning, or whose citizens enjoy greater advantages of obtaining an education.

By an official statement, it appears that in 1825, with a population of about 12,000,000, there were in this country 20,887 elementary schools, and 736 schools of a higher order. In the elementary schools there were,

boys,	822,077
Girls,	757,922
In the schools of a higher order, there were, boys,	49,169
Girls,	57,050
Total,	1,644,218

There were also in the winter of 1825-6, 5452 students in the Prussian Universities, viz,:—

In Theology,	2,437
In philology and philosophy,	5,77
In jurisprudence and government,	1,724
In medicine,	714
Total,	5,452

From this statement it appears that the number of children and youth taught in all the schools in Prussia is, in proportion to the whole population of that country, as one to seven and a quarter, nearly; a much greater proportion, we believe, than can be shown by any other nation in Europe,

In the state of New-York, the number of children taught in the *common schools*, during the last year, was 499,424, to which we may add, to make it round numbers, 3,576 students in colleges, academies, &c., making the total number of children and youth taught in this state, 503,000, which, to the whole population of the state, bears the proportion of about 1 to 4.

MISCELLANY.

IMPRISONMENT FOR DEBT.

This subject has for many years past claimed and received the anxious attention of the humane and benevolent in every part of our country. Many attempts have been made both in congress and in the legislatures of the different states, to expunge from their statute books, those Draconian laws which authorise a creditor to incarcerate, in the walls of a prison, the body of his unfortunate debtor; but we believe that in three or four states only, has imprisonment for debt been abolished, though in most, if not all, laws have been enacted greatly ameliorating those which formerly existed in regard to debtors. In congress, the passage of a law abolishing imprisonment for debt, has been urged in vain, year after year, by a gentleman, formerly a member of the senate,* with a zeal, eloquence and perseverance worthy of better success.

That laws should exist at the present day, and in a government founded as ours is upon the basis of personal liberty, authorising one man to commit another to *prison* because he happens to be *unable* to meet his pecuniary engagements, is a circumstance that cannot fail to excite the surprise of every thinking man, and the regrets of every benevolent one. That these laws are contrary to the spirit of our government, and that public opinion is opposed to them, there can be no doubt; the question may then be asked, why are they not repealed? In reply to this question we would observe, that we know of but one reason why they have so long been suffered to remain in force, and that is, the difficulty of so altering them, that while the *honest debtor* shall be protected against the legalized oppression of his creditor, the honest *creditor* shall not at the same time be deprived of his redress against him who refuses to pay his just debts when he has abundant means of doing so; and truly, this difficulty is by no means a trifling one. It is almost impossible for any human being, however wise or experienced, to frame a law that shall discriminate between crime and misfortune; that shall punish the one while it protects the other;—and he who shall devise one that shall effect these two objects—that shall equally protect the honest creditor, and honest debtor, will deserve the thanks and gratitude of his country.

* Col. R. M. Johnson of Kentucky.

But notwithstanding the difficulties with which the subject is surrounded, we believe that a system might be adopted, more consistent with the genius of our government, less oppressive in its operation, and more effectual in coercing payment from *dishonest* debtors. The great fault of the laws as they exist at present is, that they make no discrimination between the debtor who has the *disposition* but not the *means* to pay his debts, and him who, on the contrary, has the *means* but not the *disposition*. That a creditor should be empowered to act the tyrant over the former,—to separate him from a family, probably dependant on his daily labour for their scanty subsistance, and to confine him where felons alone should be confined, is shocking to every feeling of humanity. So on the contrary, that a man should be allowed to live in the continual indulgence of all the luxury that wealth can procure, while he refuses to pay his honest debts, and perhaps daily passes his creditor without deigning to bestow upon him, even a look of recognition, is equally abhorent to our sense of justice and equity. The former is entitled to the sympathy of his fellow men, while the latter deserves their execrations and the severest penalties of the law.

On this subject, the managers of the Prison Discipline Society of Boston, in their fifth annual report, which we have lately received, have presented many letters from distinguished men in different parts of the country, all of which concur in condemning the laws as they now exist, and strongly recommend their alteration in such a manner that the unfortunate debtor shall be protected from imprisonment, while the *dishonest* shall be punished as a criminal:—in these sentiments we entirely concur. From these letters we have made a few extracts, showing the opinion of different eminent individuals in regard to the subjeet under consideration.

Extract of a letter from the Hon. Edward Everett.

"Although crime may be connected with insolvency, yet insolvency is not of itself a crime. When fraud has been committed, let that fraud be proceeded against under known laws, and punished, I care not how severely, so the bounds of reason and humanity be not passed. But inability to pay one's debts is itself no proof of crime. It may, and often does, arise from the act of God, and misfortune in all its forms. A man may become insolvent in consequence of sickness, shipwreck, a fire, a bad season, political changes affecting trade at home and abroad; or, being wholly prosperous in his own business, he may be involved in the ruin of his debtor."

* * * * * *

"To deprive a citizen of liberty is one of the highest inflictions of penal justice. Next to capital punishment, it is the most infamous punishment known to our law. The power of wielding this formidable weapon ought to be lodged exclusively in the hands of the magistrate. Grave public reasons should alone decide when it should be employed. The present law submits to the discretion, the caprice, and the passions of the creditor, whether he will or will not subject a citizen to this odious infliction of penal justice."

Extract of a letter from the Hon. Daniel Webster.

"There are two sorts of fraud, either of which, when proved, ought to prevent a liberation of the person, viz.: fraud in contracting the debt, and fraud in concealing, or making away with, the means of payment. And to the usual provisions of the bankrupt act ought to be added, that no one should be discharged who is proved to have lost money in any species of gaming; and I should include in this class, *all adventurers in lotteries.* Having tendered his own oath, and made just explanation of any circumstances of suspicion, if there be such, and not having lost money by gaming, the debtor ought to be discharged at once."

Extract of a letter from the Hon. Artemas Ward, of Boston.

"To imprison a debtor, whether Christian or heathen, believer or infidel, when there was no fault or fraud on his part, and whose inability arose wholly from misfortunes which human prudence and reasonable use of his faculties could not guard him against, be his debt one or ten thousand dollars, in my mind would be unjust, cruel, inhuman, and unchristian. A debtor who is without fault ought to be exempt from suffering, disgrace, or punishment; and a fraudulent, unfair, dishonest debtor ought not to escape without being punished according to the aggravation of his offence. Unless some penalty is annexed to dishonest insolvency, people will be induced to buy on credit, and live on the fruit of the labour of others, rather than to earn something themselves."

Extracts of a letter from the Hon. Benjamin Pickman, of Salem.

"According to my observations, a large portion of those persons who have been imprisoned for debt, were so for very small sums, and to gratify a malicious or revengeful temper."

* * * * *

"If the debtor so confined be a bad man, it only serves to excite in him a spirit of revenge; if he be a good, but unfortunate man, it evidently renders him incapable, for the time, of providing for the support of himself or his family, should he have one, and thereby increases his inability to pay his debts."

* * * * *

"While I entertain these opinions respecting imprisonment for debt, I also think that honesty cannot be too much encouraged, and that every species of dishonesty ought to be severely punished. If a debtor attempts to defraud his creditors he should be punished for it; but then it should be considered as a public crime, (like forgery, for example,) and accordingly prosecuted under the authority of government. Unfortunately, the men who are guilty of the greatest frauds upon their creditors, are not generally the men who are imprisoned for their debts. How many insolvents have there been, who have failed for very large sums, and who have not paid ten cents on the dollar, and, after having compromised with their creditors, by a deceptive representation of their property, have lived like men of large fortune! And among those creditors were, perhaps, included widows and orphans, who, by their failure, were deprived of the means of support. Such men can hardly be too severely punished, or too much despised."

But, notwithstanding the decided and unqualified disapprobation of imprisonment for debt, which has been thus called forth from some of the most distinguished men in the country, still we are aware that there are many good men who candidly believe the re-

peal of those laws would be attended with consequences much more injurious to the community at large, than result from those laws as they now exist. It appears to us, however, that these persons do not view the subject in its proper light; they appear to draw the conclusion that if a creditor cannot be permitted to coerce payment from his debtor by imprisonment, the latter has only to secrete his property, or remove it from the reach of legal process, and set the former at defiance. Now this, so far from being the effect of the abolition of imprisonment for debt, is one of the evils of the present system, which those opposed to that system propose to remedy. So far from depriving a creditor of the power of compeling his debtor, if *able*, to pay him, the proposed alteration of the laws would strengthen that power, by treating the dishonest debtor, or he who has the means, but refuses to pay his debts, as a *criminal*, and punishing him as such.

The position assumed by those who advocate the abolition of imprisonment for debt is, that *inability* to pay a debt, contracted in good faith, with a reasonable expectation of being able to pay it, and an honest intention of doing so, is a misfortune, but not a *crime*. "That to contract a debt with fraudulent intent, and to evade by fraudulent means the payment of a just debt, are *criminal offences*," and those who are guilty of such acts ought to be punished as criminals. And that no person ought to suffer the punishment due to *crime* alone, but such as have been convicted thereof by due course of law.* While therefore the friends of the abolition of imprisonment for debt, urge the repeal of the laws authorizing it, they reccommend, at the same time, the enactment of others providing for the severe punishment of those who obtain credit by fraudulent representations of their property, or who fraudulently conceal their property from their creditors, and live in idleness and luxury.

SNOW.

SNOW is composed of aqueous particles frozen in the air. Frozen water becomes ice; snow therefore differs from ice only in this, that the water which constitutes ice, freezes when at its usual density, but that which forms snow freezes when its particles are separated or converted into vapour. From a variety of experiments it has been found that snow is twenty-four times more rare than water,

* See Resolutions adopted at a numerous and respectable meeting held in this city, a short time since, for the purpose of taking this subject into consideration.

and that when it has just fallen it occupies ten or twelve times as much space as the water which it yields when melted. Nevertheless snow is not merely water, for the structure of its parts, and the effects it produces, correspond neither with those of water, nor with those of ice. On examining a flake of snow with a magnifying glass, the whole of it appears to be composed of five shining spiculæ, diverging, like rays, from a centre. As the flakes fall down through the atmosphere, they are continually joined by more of those radiated spiculæ, and thus increase in bulk, like drops of rain or hailstones. Many are of a regular figure; for the most part, stars of six points, and are as perfect and transparent ice as any we see on a pond. On each of these points are other collateral ones, set at the same angles as the main points themselves. Others seem to have been thawed and frozen again into irregular clusters by various winds; so that the whole body of snow resembles an infinite mass of irregularly figured icicles. The theory of the formation of snow is therefore briefly this; a cloud of vapours being gathered into drops, these drops immediately begin to descend. Meeting with a freezing air as they pass, in their fall through a colder region of the atmosphere, each drop is congealed into an icicle, shooting itself forth into several points. These still continue their descent, and meeting with some intermitting gales of warmer air, or touching upon each other in their continual waftage to and fro, some of them are a little thawed, blunted, and again frozen into clusters, or entangled so as to fall down in what are denominated flakes. STURM.

INDUSTRY.

"He that by the plough would thrive
Himself must either hold or drive."

GENTLEMEN,—through the medium of your excellent work I wish to present a few ideas to my brother Mechanics, suggested by the above quotation from Franklin.

Since the formation of our government no time has passed in which the mechanic had better opportunities to acquire wealth, influence and knowledge than the present. Many in the community are looking over our country's surface for the best soils, and opening her bowels for her rich stores, and all are interested in those things which we call domestic. The labourer finds his toils repaid, his wants amply supplied, and his happiness increasing in a ratio commensurate with his personal habits and judicious action. Our laws are daily becoming more perfect, and our rational liberties bet-

ter understood, and knowledge seems to be running to and fro and increasing. We as mechanics, as men, as men necessary to the community, must feel our personal worth, that our country may feel our united influence, and as we commence our exertions, so to a very great extent will be the character of a majority of the community who shall follow in our steps. Men of our profession have always exerted a salutary influence in our Halls of Legislation, and in private circles, and we shall always have influence while the sacred charter of our liberties assures us that man is free and equal.

But in order to benefit the government under which we live, we must follow the example and precept of him who gave to the farmer the motto at the head of these remarks. We must be systematic in all our plans, regular in our business, atttentive in our shops, industrious in our habits, and solicitous to obtain good PRACTICAL COMMON-SENSE KNOWLEDGE, and then our services will be wanted, absolutely necessary for the wellbeing and growth of our happy land. Then hard times, which are too often the result of negligence and bad management of the labouring class of the community, will not be known among us, for we shall all be prepared by the savings of our industry to supply our necessary wants, and cheered with the hope of soon seeing better and happier times. Then too, failures among us will not be so frequent, for industry and personal attention will secure business and confidence, whilst the most splendid sign, and neglected shop, become the ridicule of beholders. Then too, industry will be accompanied with economy, for he that is busy and possesses a good understanding, will "save the pennies that the pounds may be increasing," and he that is wise will be among the last to leave a good profession for all the fancied gains of the speculator, and he that understands any thing of the analysis of his being will so economise his time as to spend much of it in cultivating his mind and fitting himself for properly filling any station to which he may be likely to be called.

We should not be surprised in seeing some rail against us, but our course should always be a noble, high-minded and intelligent one; such men as Washington, Franklin, and Sherman should be our examples, and by following in their steps we shall be useful and valuable citizens though we may not equal them in all their excellencies. We must *think* more, read more, labour more, and *then* we shall not only deserve to be called the sinews of our country, but we shall be its bone, muscle, and mind; let our efforts be redoubled, our life perfectly systematic, our minds filled with principles of virtue and then our country will rejoice while our standard shall unfurl the head of Franklin, and the motto he followed.

E. B. P.

STEAM BOATS.

[From Watson's Annals.]

In the year 1788, the bosom of the Delaware was first ruffled by a steam-boat. The projector at that early day was John Fitch, a watch and clock maker by trade, and a resolved infidel in theology, He first conceived the design in 1785; and being but poor in purse and rather limited in education, a multitude of difficulties, which he did not sufficiently foresee, occurred to render abortive every effort of his most persevering mind, to construct and float a steam-boat.

He applied to Congress for assistance, but was refused; he then offered his invention to the Spanish government for the purpose of navigating the mississippi, but with no better success. He at last succeeded in forming a company, by the aid of whose funds he launched his first rude effort as a steam-boat, in the year 1788.—The idea of wheels had not occurred to Mr. Fitch; but oars working in a frame, were used in place of them. The crude ideas which he entertained, and the want of experience, subjected this unfortunate man to difficulties of the most humbling character. Regarded by many as a mere visionary, his project was discouraged by those whose want of all motive for such a course rendered their opposition more barbarous; while those whose station in life placed it in their power to assist him, looked coldly on, barely listening to his elucidations, and receiving them with an indifference that chilled him to the heart. By a perseverance as unwearied as it was unrewarded, his darling project was at length sufficiently matured, and a steam-boat was seen floating at the wharves of Philadelphia; so far, his success amid the most mortifying discouragements, had been sufficient to prove the merit of the scheme. But a reverse awaited him, as discouraging as it was unexpected. The boat performed a trip to Burlington, a distance of twenty miles, when, as she was rounding at the wharf her boiler burst. The next tide floated her back to the city; where, after great difficulty, a new boiler was procured. In October 1788, she again performed a trip to Burlington. The boat not only went to Burlington, but to Trenton, returning the same day, and moving at the rate of 8 miles an hour. It is true she could hardly perform a trip without something breaking, not from any error in Fitch's designs or conceptions, but, at that time, our mechanics were very ordinary, and it was impossible to have machinery, so new and complex, made with exactness and competent skill. It was on this account that Fitch was obliged to abandon the great invention on which the public looked so coldly. The boat was finally laid up in the Kensington dock, where it rotted silently and unnoticed. Fitch

became more embarrassed than ever by the expenditures he had made, and after producing three manuscript volumes which he deposited in the Philadelphia Library, to be opened thirty years after his death, he was carried off by the yellow fever in 1793. To this man undoubtedly belongs the honour of completing and navigating the first American steam-boat.

In one of his journals, there is this touching and prophetic sentiment—" the day will come when some more powerful man will get fame and riches from my invention; but nobody will believe that *poor John Fitch* can do any thing worthy of attention !" I do not know that I have his precise words, but the sentiment is what I have given. The truth is, that Fitch, like Robert Morris, lived thirty or forty years too soon; they were ahead of the condition of their country; these great projects of improvements, which we now see consummated, were beyond the means of the country to execute them, and were therefore thought visionary and extravagant. Public opinion has since become better instructed, and the increase of wealth has enabled us to do what was then thought impossible.

As remembered to the eye when a boy, when seen in motion Fitch's steam-boat was graceful, and " walked the water like a thing of life." His predilections for watchmaking machinery was very manifest, for two or three ranges of chains of the same construction as in watches, were seen along the outside of his vessel from stem to stern, moving with burnished glare, in motion proportioned to the speed of the boat; and ornamenting the waist, not unlike the adornments about an Indian bride.

It is melancholy to contemplate his overwhelming disappointments in a case since proved so practicable and so productive to those concerned. Some of those thousands so useless to others, had they been owned by him, so as to have enabled him to make all the experiments and improvements his inventive mind suggested, would have set his care-crazed head at rest, and in time have rewarded his exertions. But for want of the impulse which money affords, all proved ineffective. " Slow rises worth by poverty depressed !"

Much of our steam invention we owe to our citizen, Oliver Evans. He even understood the application of it to wagons—(now claimed as so exclusively British.) As early as 1787, the Legislature of Maryland granted him its exclusive use for 14 years, and in 1781, he publicly stated he could by steam drive wagons, mills, &c, Finally, he published his bet of 3000 dollars, engaging " to make a carriage to run upon a level road against the swiftest horse to be found,"—none took him up ! and Latrobe, as a man of science, pronounced the idea as chimerical; others said the motion would be too slow to be useful, &c. He got no patrons, and others now take his fame !

THE POST.

From Watson's Annals.

"He comes! the herald of a noisy world;
News from all nations, lumb'ring at his back!"

There is nothing in which the days of "Auld Lang Syne" more differs from the present than in the astonishing facilities now afforded for rapid conveyances from place to place, and, of course, in the quick delivery of communications by the mail. Before the year 1755, five or six weeks were consumed in writing to, and receiving an answer from Boston. All the letters were conveyed on horseback, at a snail-pace gate—slow but sure. The first stage between Boston and New-York commenced on the 24th of June, 1772, to run once a fortnight, as "a useful, new, and expensive undertaking;" "to start on the 13th, and to arrive either to or from either of those places on the 25th,"—thus making 13 days of travel!* Now, it travels the same distance in 36 hours! The first stage between New-York and Philadelphia began in 1756, occupied three days, and now it accomplishes it in ten hours!

Nor are those former prolonged movements peculiar to us. It was even so with our British ancestors, not very long before us! We have a specimen of their sluggish doings in this matter, as late as the year 1712. "The New Castle Courant," of that year, contains a stage advertisement, saying that "all who desire to pass from Edinboro' to London, or from London to Edinboro', let them repair to Mr. John Baillies, &c. every other Saturday and Monday, at both of which places they may be received in a stage-coach, which performs the whole journey in thirteen days, without stoppage, (if God permit) having eighty able horses to perform the whole stage." Now the whole distance is performed in 46 hours! On the whole, it is manifest the whole civilized world have learned to move every where with accellerated motion! The facts, as they were in the olden time, are to the following effect, to wit:—

In 1683, mo. July, Wm. Penn issued an order for the establishment of a post-office, and granted to Henry Waldy, of Tekonay, authority to hold one, and "to supply passengers with horses from Philadelphia to New Castle, or to the Falls." The rates of postage were to wit:—"Letters from the Falls to Philadelphia, 3d.—to Chester, 5d.—to New Castle, 7d.—to Maryland, 9d.—and from Philadelphia to Chester, 2d.—to New Castle, 4d.—and to Mary-

* "Madame Knight's Journal" of the year 1704, shows that she was two weeks in riding with the postman, as her guide, from Boston to New-York. In most of the towns she saw Indians. She often saw wampum passing as money among the people—but 6d. a meal at inns, &c. Tobacco was used and sold under the name of black junk.

land, 6d." This post went once a-week, and it was to be carefully published on the meeting-house door, and other public places." These facts I found in the MSS. of the Pemberton family. A regular act for a post-office at Philadelphia, was first enacted in the year 1700.

Col. John Hamilton, of New-Jersey, and son of governor Andrew Hamilton, first devised the post-office scheme for British America, for which he obtained a patent, and the profits accruing. Afterward he sold it to the crown, and a member of parliament was appointed for the whole, with a right to have his substitute reside in New-York.

In 1717, mo. December, Jonathan Dickinson writes to his correspondent, saying, "We have a settled post from Virginia and Maryland unto us, and goes through all our northern colonies, whereby advices from Boston to Williamsburgh, in Virginia, is completed in four weeks, from March to December, and in double that time in the other months of the year."

In 1722, the Gazette says—"We have been these three days expecting the New-York Post, as usual, but he has not yet arrived," although three days over his time!

In 1727, the mail to Annapolis is opened this year to go once a fortnight in summer, and once a month in winter, via New Castle &c. to the Western Shore, and back by the Eastern Shore; managed by William Bradford in Philadelphia, and by William Parks, in Annapolis.

In 1729, December, the Gazette announces, that while the New-York Post continues his fortnight stage, we shall publish but once a-week, as in former times." In summer it went once a-week.

In 1738, Henry Pratt is made riding postmaster for all the stages between Philadelphia and Newport, in Virginia; to set out in the beginning of each month, and to return in 24 days. To him all merchants, &c. may confide their letters and other business, he having given security to the postmaster general. In this day we can have little conception of his lonely rides through imperfect roads; of his laying out at times all night, and giving his horse a range of rope to browse, while he should make his letter-pack his pillow on the ground!

In 1744, it is announced in the Gazette, that the "Northern post begins his fortnight stages on Tuesday next. for the winter season."

In 1745, John Datly, surveyer, states that he has just made a survey of the road from Trenton to Amboy, and hath set up marks at every two miles to guide the traveller. It was done by private subscriptions, and he proposes to do the whole road from Philadelphia to New-York, in the same way, if a sum can be made up!

In 1748, when professor Kalm arrived at Philadelphia from London, many of the inhabitants came on board his vessel for letters. Such as were not so called for, were taken to the Coffee-house, where every body could make inquiry for them, thus showing that, then, the post-office did not seem to claim a right to distribute them as now.

In 1753, the delivery of letters by the penny-post was first began. At the same time, began the practice of advertising remaining letters in the office. The letters for all the neighbouring counties went to Philadelphia, and lay there till called for—thus letters for Newtown, Bristol, Chester, New Castle, &c. are to be called for in Philadelphia.

Even at that late period the northern mail goes and returns but once a-week in summer, and once a fortnight in winter, just as it did 25 years before.

But in 1754, month of October, a new impulse is given, so as to start for New-York thereafter, on Monday, Wednesday, and Friday; and in the winter, once a-week. This, therefore, marks the period of a new era in the mail establishment of our country. It owed this impulse, exterding also to Boston, to the management of our Franklin, who was made postmaster general.

In 1755, the postmaster general, Benjamin Franklin, publishes, that to aid the trade, &c. he gives notice that, thereafter, the winter northern mail from Philadelphia to New-England, which used to set out but once a fortnight, shall start once a-week all the year round, whereby answers may be obtained to letters between Philadelphia and Boston, in three weeks, which used to require six weeks!"

In 1758, newspapers which aforetime were carried post free per mail, will, by reason of their great increase, be charged thereafter to the small price of 9d. a year for fifty miles, and 1s. 6. for 100 miles. This was, most probably, the private emolument of the rider; the papers themselves not having been mailed at all, it is probable.

Finally, in 1774, which brings colonial things nearly to its final close, by the war of independence, soon after, we read that "John Perkins engages to ride post to carry the mail once a-week to Baltimore, and will take along or bring back led horses or any parcels."

THE WHYS AND WHEREFORES.

"Why is a harp or piano-forte which is well-tuned in a morning drawing-room, not perfectly in tune when a crowded evening party has heated the room?

"Because the expansion of the strings is greater than that of the wooden frame-work; and in cold, the reverse will happen.

"Why are urns for hot water, tea-pots, coffee-pots, &c. made with wooden or ivory handles?

"Because, if metal were used, it would conduct the heat so readily that the hand could not bear to touch them: whereas wood and ivory are non-conductors of heat.

"Why does a gate in an iron railing shut loosely and easily in a cold day and stick in a warm one?

"Because, in the latter there is a greater expansion of the gate and railing than of the earth on which they are placed.

"Why are thin glass tumblers less liable to be broken by hot water, than thick ones?

"Because, the heat pervades the thin vessels almost instantly, and with impunity, whereas the thicker ones do not allow a ready passage of heat.

"Why will a vessel which has been filled to the lip with warm liquid, not be full when the liquid has cooled?

"Because of the expansion of the fluid by heat. Hence some cunning dealers in liquids make their purchases in very cold weather, and their sales in warm weather.

"Why is a glass stopper, sticking fast in the neck of a bottle, often released by surrounding the neck with a cloth taken out of hot water, or by immersing the bottle up to the neck?

"Because, the binding ring is thus heated and expanded sooner than the stopper, and so becomes slack or loose upon it.

"Why does straw or flannel prevent the freezing of water in pipes during the winter?

"Because it is a slow conducting screen or covering, and thus prevents heat passing out of the pipe. By the same means the heat is retained in steam-pipes.

"Why will the putting two glass tumblers that are fast, one in the other, into hot water, enable a person to sepparate them?

"Because, the outer one is expanded by the heat before the inside one is affected, which is thus loosened. *Arnott.*

SCHOOLS, SOCIETIES, &C.

NATIONAL ACADEMY OF DESIGN.

An association of artists either professionally attached to them, or pursuing arts as amateurs, has been formed in this city, under the name of the National Academy of Design. Improvement among the artists themselves in the elegant branches of painting, engraving, sculpture and architecture, and the facilities afforded of instructing students in these departments, are the laudable objects which the founders of this institution have had in view. They have already made a most auspicious beginning;—spacious and convenient apartments have been provided by them in Clinton Hall, where a very respectable collection of speciments has been formed, and provision made for a continual addition to their stock. A wholesome and judicious constitution has been adopted, by which the management, and economical regulation of the society's affairs are restricted to the artists, the practical members of the association who are no doubt best capable of judging what is required for the advancement of their respective departments. Under this salutary and effective regulation, students or amateurs who are desirous of perfecting themselves in the several arts, are accommodated with every kind of model necessary for their improvement, as well as the advice and assistance of the academicians. A very small fee is required of them, for which they have access to the best subjects of study, and we may add, to the best style of instruction. The most faultless models are placed before them; and thus their taste is fixed at the out set by a close imitation of the style of the greatest masters of ancient or modern times.

Among the members are many of our native citizens who have attained a high standing by their acquirements in their pecoliar branches, of the arts, or in the sciences subsidiary to them.

Lectures on various subjects connected with the objects of the society are delivered to the students, and the public are liberally invited to attend then. Courses of these lectures have this season been delivered on painting, on perspective, on ancient numismatics, and heathen mythology, and others we understand are yet to be delivered on some other branches of the arts. Nothing appears to be wanting to render this excellent association what its most sanguine friends can desire it should be, but the necessary means to enable them to increase their collection of pictures, statues, models, and books;

these means we hope will not long be wanting;—we trust that the annual exhibitions which the society will be enabled to make under the directions of its managers, will be numerously attended by a liberal and discerning public, who will thus aid an institution that is vigorously, though quietly applying itself to the promotion of those arts which in every age have contributed so essentially to the refinement of society.

EXTRACT FROM THE PROCEEDINGS OF THE LYCEUM OF NATURAL HISTORY.

October 25th.—Mr. Cooper read a notice of several species of North American birds, which appear to have changed or extended their residence among us within a few years.

November 1st.—Captain Delafield presents several interesting specimens of shells and crabs in a fossil state, from the dry dock excavation at Gosport.

8th.—Mr. George Gibbs, of Turks Island, presents a collection of the marine zoophytes, and radiary animals, from the shores of that Island.

A communication was read from Professor Thompson, of Glasgow, stating that in addition to the American minerals examined by him, of which an account has been published in the annals of the Lyceum, he had analysed some others: among these he finds that what is called the *radiated tremolite*, found in a rock at Corlear's Hook, in this city, is the *hydrous anthophyllite;* that the *scapolite* of Bigtown, in Canada, is a variety of *pyroxene*, which he calls *alalite;* and he gives the name of *Perthite* to a new mineral found at Perth, in Upper Canada.

Dec. 13.—A specimen was exhibited by Dr. Mitchill, of polished *Breccia*, from Somerville, New-Jersey.

Dr. Feuchtwanger presents crystals of a mineral found by him at Hoboken, in a mass of carbonate of magnesia, having characters and appearances very similar to *carbonate of Strontian*, the measurement of the angles of the crystals being the same.

20th.—Dr. Boyd presents several cryptogamic plants from the White Hills, N. H.—among them the *cetraria islandica*, or Iceland moss, in fruit.

Several specimens illustrating the geology of New-Jersey, Delaware, and Maryland, were presented by Dr. Morton, of Philadelphia.

27th.—A large piece of wax amber, weighing two pounds, collected on the Danish coast, was exhibited by Dr. Feuchtwanger.

Jan. 3.—Dr. Feuchtwanger presents specimens of *garnet* and *cinnamon stone* in gneiss rock, and *anthophyllite* from Brooklyn, L. I.

The *sticta pulmonacea*, a lichen from the White Hills of New-Hampshire, though growing very commonly over the whole country, was presented by Dr. Boyd.

10th.—Specimens of two native plants were exhibited which had been gathered 22d of last November, in the pine barrens of New-Jersey, in Monmouth county, and which were then in flower, viz. the *kalmia augustifolia*, or dwarf laurel, and the *diapensia barbulata*.

17th.—A report was read by Dr. Boyd on a mineral substance referred to by him for examination, consisting of brown *hornblende*, from Warwick, Orange county. Before the blowpipe this mineral fused into a yellowish white enamel, similar to actinolite, but in other physical characters it is identical with hornblende.

Dr. Dekay read a paper on "the examination of the facts and arguments by which it has been attempted to prove that *lava* has never been subjected to great elevation of temperature." In this memoir, the author avoiding any decided hypothesis, confined himself to the examination of the heat of volcanic lava, and endeavoured to show that the arguments by which the doctrine of low temperature had been defended, were opposed by numerous facts; at the same time he examined, on different principles, the few facts by which the hypothesis of a low temperature was attempted to be proved.

It having been asserted that the fish known by the English name of *Turbot*, had been recently sold in the markets at Boston, and as the Turbot, *pleuronectes maximus*, Lin., had hitherto never been noticed as an inhabitant of our waters, the appearance of that fish for the first time, if the name has not been erroneously applied to another species of pleuronectes, was considered as of sufficient interest to be ascertained correctly.

24th.—Mr. Cooper reports on the expediency of a catalogue being prepared by the Lyceum, of all the indigenous natural objects found in the vicinity of this city, within the limits of thirty miles around it, and to include all the mineral, vegetable, and animal productions of this region. It was accordingly resolved that committees of the members be charged with the duty of preparing and submitting to the Lyceum, as soon as practicable, such a catalogue.

31.—Information was communicated through Mr. Featherstonhaugh, of the discovery of a great variety of bones of extinct animals at Big Bone Lick, in Kentucky, and among them a perfect head of a *mastodon*, with the teeth and tusks entire.

Dr. Feuchtwanger read a memoir on amber.

Feb. 7.—Major Delafield exhibited specimens of *Lignite* with embedded crystal of Feldspar, from Bovey Tracy.

Dr. Boyd presents the mineral called *Catseye*, from Massachusetts, both polished and unwrought. Also, specimens of clay from Bellows-Falls, Vermont.

14.—Professor M'Vickar communicates the fact observed by him on his recent visit to Europe, of *anthracite* being found on the Alps, at an elevation of 1000 feet above the Hospice du St. Bernard, and presents specimens collected by him there—also of *chiastolite* from Skiddaw, coal from Lyons, &c.

NEW PUBLICATIONS.

Williams's Annual Register,—Messers. J. Leavitt, & Collins & Hannay, have just published Williams's Register, for the present year, and from the examination we have been able to give it, we are inclined to think it will by no means disappoint the expectation which its popular predecessor had raised of its value. We do not see how it would be possible to condense more information, and that too of a valuable kind, in a volume of the same size, than is to be found in this. The following is a synopsis of the principal subjects contained in it, namely:

I. An Almanac and astronomical calculations of the year.

II, Statistics of the State of New.York, viz; Census of the Counties, Cities, Towns and Villages, together with that of the United States for 1830; Returns of the late election; Post offices, and Post Masters, in the state; Table of Roads and Distances; Canals, Canal Revenue, &c.; Banks and Insurance Companies; Manufactories of Wool, Cotton and Iron; News-papers; Moral and Religious Societies, Colleges, Acadamies and Common Schools.

III. Civil, Judicial, Ecclesiastical and Military list, &c. viz: Courts and times of holding them; Attorneys and Counsellors at Law, with their Agents at Albany, New-York, Utica, and Canandaigua; Clergy of the different denominations; Military establishment; Executive, Legislative, and Judicial officers of the state, and various other information relative to the State.

IV. A Concise National Register, viz: Officers of the General Government; Ministers to and from Foreign Powers; Army and Navy; West-Point Academy; United States Bank and its

Branches; Tariff of Duties; a variety of Statistical tables, &c. &c.

As a book of reference, merchants and professional men in particular will find it a valuable appendage to their counting rooms and offices.

CHEMISTRY OF THE ARTS.—*Being a practical display of the arts and manufactures which depend on chemical principles; adapted to the United States: with treatises on Calico Printing, Bleaching, &c. &c.—By* A. L. PORTER, *late Professor of Chemistry in the University of Vermont. Published by Carey & Lea, Philadelphia.*

Among the multifarious arts and manufactures which have been called into existence by the wants and luxuries of civilised man, there are very few that are not in some degree dependant on, or connected with, the principles of Chemistry. So well is this understood at the present day, that almost every artisan feels the necessity of acquiring a knowledge of the principles of a science of such universal application; and we are accordingly gratified with seeing merchants, mechanics, clerks, and apprentices, men who formerly deemed the subject far above their comprehension, and withal entirely useless to them, regularly attending lectures on this science.

The volume whose title we have given above is designed to show the application of Chemistry to the arts, manufactures, &c, and to aid the practical operator. Its chief merit consists in being almost entirely of a *practical* character, and so clear and minute in its directions as to render it almost impossible for the reader to mistake its meaning or directions. It is a volume of about 800 octavo pages, and contains much information, valuable to artists, mechanics, and manufacturers, and highly interesting to those who have any desire to become acquainted with the application of science to the arts; to all such, we commend this valuable work.